

ACIDIC PRECIPITATION IN ONTARIO STUDY - APIOS

CUMULATIVE (28 DAY) PRECIPITATION CHEMISTRY LISTINGS
OF SITES IN INDUSTRIAL/URBAN AREAS IN ONTARIO
JANUARY 4, 1983 - JANUARY 15, 1985



Atmospheric Processes Studies Unit
Air Quality and Meteorology Section
Air Resources Branch
Toronto, Ontario
Canada, M5S 1Z8

January 1987

ARB-003-87-AQM

A.P.I.O.S. Coordination Office
Ontario Ministry of the Environment
6th Floor, 40 St. Clair Ave. W.,
Toronto, Ontario
Canada, M4V 1P5
Project Coordinator : Dr. G.W. Scott

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Cumulative (28 day)
precipitation chemistry listings
of sites in industrial/urban areas
in Ontario : January 4, 1983 -
78096

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ACKNOWLEDGEMENTS

This report was prepared by Diane Green of the APIOS Atmospheric Deposition and Chemistry Program. However, the data themselves are a product of the combined efforts of many individuals. Precipitation samples were collected by a large number of site operators, whose names cannot be individually mentioned here, under the coordination of the APIOS environmental technicians Jayne Blight (Haldimand-Norfolk), Rod Brooks (Germain Park), Errol Butler (Toronto) and Chris Hutt (Sudbury). Sample handling was carried out by Dan Orr and Liane Skelton, and overall network coordination by Bill Bardswick of the Air Resources Branch. Chemical analyses were performed at the Laboratory Services Branch under the coordination of Frank Tomassini and Barry Loescher. Invaluable clerical and computer assistance were provided by Koshy Mathew and William Chang, respectively of C.C. and C. Computer Systems Inc.

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PART I

INTRODUCTION

INTRODUCTION

The data listed herein are a summary of the results acquired from the APIOS cumulative precipitation sites in industrial/urban areas in Ontario from January 4, 1983 to January 15, 1985. The sampler utilized for collection of wet cumulative deposition is the M.I.C. Type "A" collector (Sangamo). During May to October when precipitation is mainly in the form of rain, the Sangamo collector is equipped with a 34 cm x 61 cm polyethylene bag insert. For snow and snow/rain collection from November to April, deeper collection vessels are utilized (122 cm) with 34 cm x 122 cm polyethylene bag inserts. The deeper collection vessel is utilized to reduce snow blow out. The period of accumulation per sample was monthly since the network inception until January, 1982. After that time, a 28 day sampling period was used.

All data presented in this report have been screened for validity. Remarks and qualifications have been appended to records, and/or results where necessary. The screening procedure involved checking each record for chemical analysis integrity (e.g. ionic balance, observed vs. theoretical conductance). Gross limit checks were applied to the results. Upper limits were determined as $M + 2S$ where median (M) and scale (S) represent robust estimates of mean and standard deviation respectively. Scale of the distribution was estimated from interquartile distance, i.e. $S=0.74$ (3rd quartile - 1st quartile) based upon logarithmically transformed results. In a situation where the distribution is significantly bounded by reported detection limits, S may be estimated as follows, $S=1.48$ (3rd quartile - 2nd quartile). All lower gross limits were specified as zero. The data were also screened for outliers statistically by applying the Dixon Ratio test to the highest and lowest values observed in each region on a monthly basis. Outliers were determined at the 95% level of confidence. Records and/or results deemed unreliable were flagged but not deleted. Because of the locations of these special study sites which are in industrial/urban areas, high variability in the analytical results is observed as expected. Therefore uncertainty still may remain after data have been screened for validity and subjective review has been applied to flag analytical results. Office comment "N", indicating abnormal sampler efficiency, is added to a record if calculated efficiency is found to be less than 50% or greater than 120%. If a field code (i.e. F, G, H, I, J, L, M, or P) indicating situations which might affect sampler efficiency is appended to a record with an apparently abnormal calculation efficiency, then that efficiency is flagged as unreliable rather than abnormal, and office comment "N" is not appended. Data in the Haldimond-Norfolk (NEMP) region have been reported elsewhere previously (1). The flags might be different in some cases because in the previous case, these data were not subject to as stringent screening criteria as they are here.

(1) Kiely, P. 1984: Nanticoke Environmental Management Program Network Data Summary for 1983 MOE Report Number ARB-168-84-ARSP

Station Identification

The station identification is defined by two descriptive fields (e.g., Binbrook/Cumulative precipitation). The first field refers to the sampling location. The second field describes the sampling interval and the sampling type (e.g., wet or dry). All precipitation chemistry listings are given in alphabetic order by station name within each region.

Cumulative Precipitation Chemistry Listings

Sample type, as coded in the data listings, represents the state of the collected sample at time of removal. The sample date represents the date on which the sample was removed from the sampler. All chemical analyses were done on unfiltered samples. Lab pH entries represent pH measurements obtained at the MOE Laboratory in Toronto. Total hydrogen concentrations (mg l^{-1}) are reported for both gran analysis and total fixed end point (to pH 8.3) acidity. For a complete outline of lab analytical methodology please consult the Ontario Ministry of the Environment report "Outlines of Analytical Methods" coordinated by Water Quality Section, Laboratory Services Branch, June 1981.

Of the reported metals, aluminum, copper, iron, zinc and lead were found to display significant adsorptive losses. As a result, a leach solution of 5% HNO_3 (1 litre) is placed in the emptied collection bag for 24 hours. The leach solution is then analysed for the above metals and a final metal concentration is then calculated. In the calculation of final metal concentration, if a detection limit is encountered, a value corresponding to one half the detection limit is utilized.

Co-located with each sampler is a cumulative precipitation gauge which serves as a primary standard of precipitation during the collection period. However, if the cumulative gauge depth is missing or is thought to be inaccurate, then an approximate precipitation depth is determined. The approximation is made by accumulating three surrounding CLIMAT* station daily depth gauge results individually and then interpolating linearly to the APIOS station. Sometimes precipitation gauge results could not be calculated by the above method, in which case the data are missing in the tables to follow.

Calculation of Equivalent Precipitation Depth (mm)

$$\text{Equivalent Precipitation Depth (mm)} = \frac{\text{Volume Collected (ml)} \times 30.8}{1000}$$

Calculation of Observed Sampling Efficiency

$$\% \text{ Efficiency} = \frac{\text{Equivalent Precipitation Depth (mm)} \times 100 \%}{\text{Gauge Depth (mm)}}$$

* Environment Canada, Atmospheric Environment Service Meteorological Observations in Eastern Canada, Monthly Record

Field Comment Code Index

- A - Insects in sample
- B - Leaves in sample
- C - Particulates in sample
- D - Fibres in sample
- E - Sample not submitted
- F - Sampler malfunctioned
- G - Sample spilled or leaked
- H - Volume incorrect
- I - Event(s) missed
- J - Wet side open when not precipitating
- K - No precipitation collected
- L - Part of event missed
- Q - Other

Office Comment Code Index

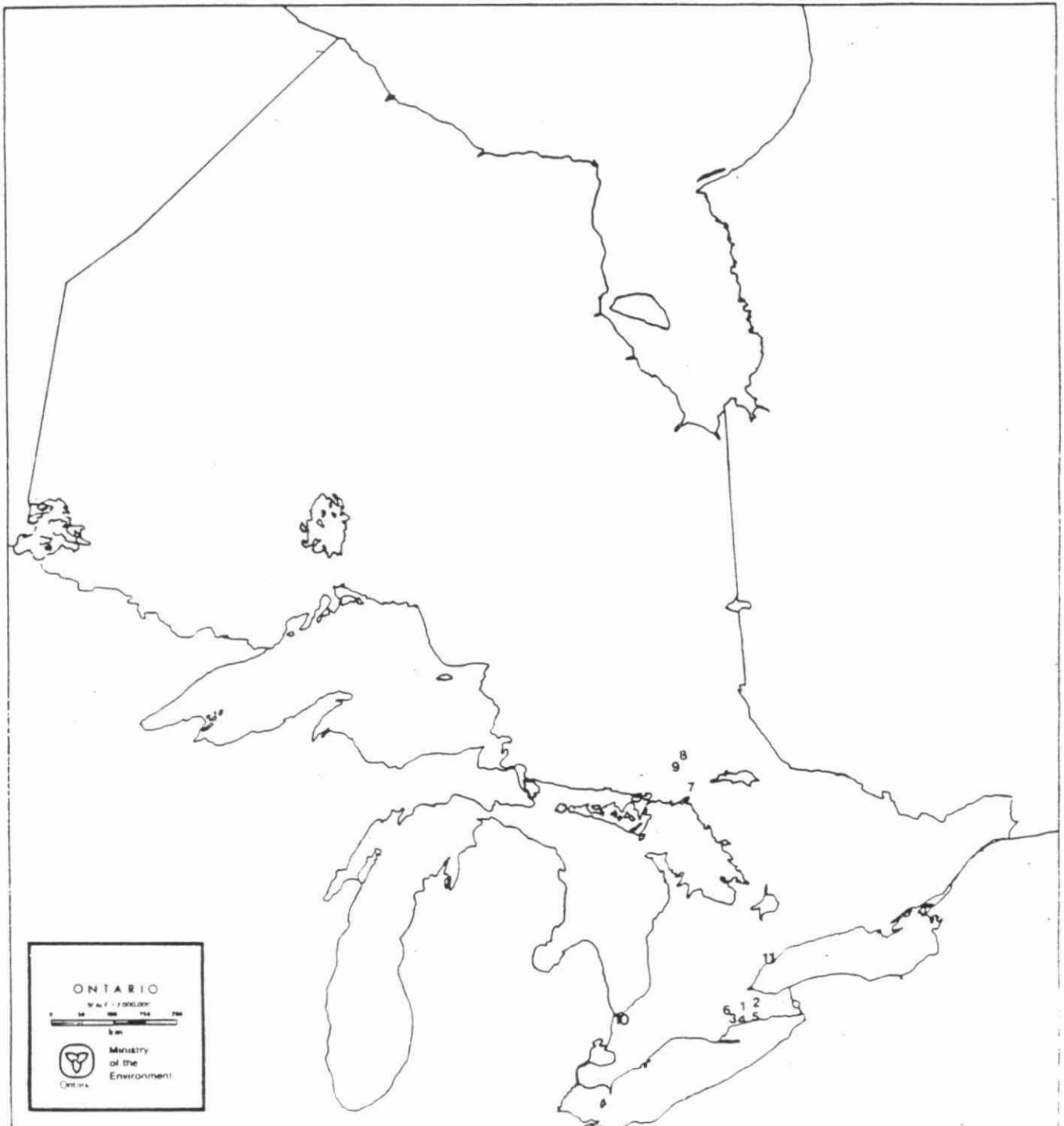
- C - calculated/observed conductance discrepancy
- H - calculated/observed pH discrepancy
- J - Δ pH large
- M - poor ionic balance
- N - abnormal sampler efficiency
- T - free hydrogen exceeds total hydrogen
- X - sample lost

Analytical Result Remark Code Index

- > - actual result greater than value reported
- < - actual result less than value reported
- T - actual result less than criterion of detection
- W - no response, minimum possible result reported
- A - approximate value
- U - unreliable result
- L - bag leach result not available
- L - bag leach result not available and precipitation sample result has been reported as a detection limit
- G - exceedance of gross limits check
- D - outlier of Dixon Ratio Test
- B - exceedance of gross limits check and outlier of Dixon ratio Test

PART II

STATION DESCRIPTION AND LOCATION MAP



SITE DESCRIPTIONS OF STATIONS IN INDUSTRIAL/URBAN AREAS

<u>MOE REGION</u>	<u>STATION NAME</u>	<u>LATITUDE</u> (North)	<u>LONGITUDE</u> (West)	<u>UTM GRID CO-ORDINATES</u>	
				(Northing)	(Easting)
Haldimond- Norfolk (NEMP)	Binbrook	43°07'06"	79°52'40"	4774500	591400
	Canborough	42°59'77"	79°38'42"	4760800	611950
	Dog's Nest East	41°48'40"	80°08'46"	4739600	570200
	North Dufferin	42°59'39"	79°58'38"	4759990	583750
	South Canfield	42°55'39"	79°44'49"	4752700	602600
	Villa Nova	42°55'39"	80°12'13"	4753500	565400
Sudbury	Burwash	46°15'46"	80°48'48"	5123000	514600
	Hanmer	46°39'45"	80°56'37"	5167400	504300
	Lively	46°26'45"	81°09'00"	5143400	488400
Other Sites	Germain Park	42°58'35"	82°23'00"	4758750	387250
	Toronto	43°39'15"	79°23'14"	4835500	630100

PART III

1983 HALDIMOND-NORFOLK (NEMP)

CUMULATIVE PRECIPITATION CHEMISTRY LISTINGS

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : BINBROOK/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
FEB 1,83	JAN 4,83	1345	1150	4	21.4	0	39255	3	1	68	H
MAR 1,83	FEB 1,83	1200	1345	3	41.4	0	39276	3	1	U 55	DCIJL
MAR 29,83	MAR 1,83	1355	1250	4	56.0	0	39279	3	1	64	CD
APR 26,83	MAR 29,83	1330	1340	1	70.0	0	39296	3	1	61	D
MAY 24,83	APR 26,83	1340	1120	1	82.0	0	39309	3	1	U 61	CDFI
JUN 21,83	MAY 24,83	1130	1120	1	36.0	0	39322	3	1	38	AC N
JUL 19,83	JUN 21,83	1130	1240	1	65.0	0	39329	3	1	60	AC
AUG 16,83	JUL 19,83	1245	1350	1	160.0	0	39332	3	1	70	AC HCM
SEP 13,83	AUG 16,83	1350	1215	1	11.0	0	39340	3	1	45	AC N
OCT 11,83	SEP 13,83	1215	1110	1	63.0	0	39348	2	1	63	AC
NOV 8,83	OCT 11,83	1110	1115	1	69.0	0	39351	2	1	66	AC
DEC 6,83	NOV 8,83	1115	1605	3	111.8	9	39360	3	1	59	C
JAN 3,84	DEC 6,83	1605	925	3	81.2	9	39364	3	1	48	C

REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
FEB 1,83	JAN 4,83	476.0	51.5	4.12	0.1008	5.05	0.94	1.05
MAR 1,83	FEB 1,83	751.0	40.0	4.38	0.0960	4.50	0.95	U 1.18
MAR 29,83	MAR 1,83	U 1180.0	35.0	*****	*****	U 4.85	U 0.78	*****
APR 26,83	MAR 29,83	1409.0	38.3	4.24	0.0906	3.60	0.56	0.42
MAY 24,83	APR 26,83	1640.0	33.5	4.38	0.0734	4.55	0.38	0.57
JUN 21,83	MAY 24,83	U 449.0	U 104.0	U 3.86	U 0.1966	U 15.80	U 1.55	U 2.40
JUL 19,83	JUN 21,83	1272.0	65.0	4.06	0.1296	9.30	0.88	G 1.04
AUG 16,83	JUL 19,83	3650.0	48.4	4.20	0.1140	5.40	0.54	0.42
SEP 13,83	AUG 16,83	164.0	*****	G 4.77	0.0654	*****	*****	*****
OCT 11,83	SEP 13,83	1308.0	*****	4.05	0.1220	D 7.15	0.84	D 1.02
NOV 8,83	OCT 11,83	1479.0	24.4	4.50	0.0546	4.15	0.47	0.72
DEC 6,83	NOV 8,83	2169.0	27.6	4.40	0.0680	3.30	0.52	0.45
JAN 3,84	DEC 6,83	1287.0	18.6	G 4.72	0.0454	1.85	0.35	0.60

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : BINBROOK/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
FEB 1,83	JAN 4,83	0.64	0.94	0.310	0.035	U 0.360	0.770	0.021
MAR 1,83	FEB 1,83	U 0.85	0.64	U 0.360	0.025	U 0.575	0.550	U 0.031
MAR 29,83	MAR 1,83	U 1.76	0.75	*****	*****	*****	0.380	0.047
APR 26,83	MAR 29,83	0.25	0.48	0.110	0.040	0.100	0.292	0.016
MAY 24,83	APR 26,83	0.18	0.63	D 0.160	0.065	0.055	0.580	0.012
JUN 21,83	MAY 24,83	U 0.41	U 1.50	U 0.785	U 0.155	U 0.070	U 1.470	U 0.054
JUL 19,83	JUN 21,83	0.21	1.54	G 0.330	0.140	D 0.085	1.420	0.015
AUG 16,83	JUL 19,83	0.13	0.48	0.090	0.040	0.025	0.450	0.007
SEP 13,83	AUG 16,83	*****	G 3.10	*****	*****	*****	*****	0.062
OCT 11,83	SEP 13,83	0.24	0.67	D 0.250	0.075	0.030	0.550	D 0.021
NOV 8,83	OCT 11,83	0.23	0.52	0.225	0.070	0.075	0.420	0.034
DEC 6,83	NOV 8,83	0.29	0.43	0.115	0.045	0.115	0.390	0.007
JAN 3,84	DEC 6,83	G 0.73	0.17	0.150	0.020	G 0.475	0.040	0.019

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REMOVAL DATE	EXPOSURE DATE	MANGANSE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
FEB 1,83	JAN 4,83	0.009	< 0.001	D 0.020	0.097	0.019	< 0.002	0.057
MAR 1,83	FEB 1,83	D 0.016	< 0.001	0.017	D 0.097	0.015	< 0.002	D 0.090
MAR 29,83	MAR 1,83	*****	*****	*****	*****	*****	*****	*****
APR 26,83	MAR 29,83	0.005	< 0.001	0.010	0.061	0.007	< 0.002	0.080
MAY 24,83	APR 26,83	D 0.007	< 0.001	0.008	0.079	0.004	< 0.002	0.071
JUN 21,83	MAY 24,83	U 0.028	U 0.002	U 0.026	U 0.377	U 0.027	U 0.002	U 0.306
JUL 19,83	JUN 21,83	0.008	< 0.001	0.014	0.089	D 0.019	< 0.002	0.071
AUG 16,83	JUL 19,83	0.005	< 0.001	0.004	0.048	0.007	< 0.002	0.051
SEP 13,83	AUG 16,83	B 0.036	0.001	0.043	G 0.257	G 0.025	< 0.002	G 0.158
OCT 11,83	SEP 13,83	D 0.013	< 0.001	0.013	B 0.261	0.016	< 0.002	B 0.242
NOV 8,83	OCT 11,83	D 0.012	< 0.001	L 0.014	L 0.125	L 0.008	< 0.002	L 0.132
DEC 6,83	NOV 8,83	0.004	< 0.001	0.011	0.024	0.007	< 0.002	0.031
JAN 3,84	DEC 6,83	0.010	< 0.001	0.007	0.152	0.010	< 0.002	0.154

ONTARIO MINISTRY OF THE ENVIRONMENT
 CUMULATIVE SAMPLING ANALYSIS RESULTS
 APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : BINBROOK/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
FEB 1,83	JAN 4,83	0.003	0.0002	0.0965	0.0759
MAR 1,83	FEB 1,83	< 0.002	0.0001	0.0157	0.0417
MAR 29,83	MAR 1,83	*****	*****	*****	*****
APR 26,83	MAR 29,83	< 0.002	< 0.0001	0.0914	0.0575
MAY 24,83	APR 26,83	0.003	< 0.0001	0.0705	0.0417
JUN 21,83	MAY 24,83	U 0.005	U 0.0002	U 0.1920	U 0.1380
JUL 19,83	JUN 21,83	0.001	0.0001	0.1230	0.0871
AUG 16,83	JUL 19,83	0.001	< 0.0001	0.1120	0.0631
SEP 13,83	AUG 16,83	0.007	D 0.0002	0.0552	G 0.0170
OCT 11,83	SEP 13,83	0.002	< 0.0001	0.1210	0.0891
NOV 8,83	OCT 11,83	L< 0.001	< 0.0001	0.0534	0.0316
DEC 6,83	NOV 8,83	< 0.001	< 0.0001	0.0671	0.0398
JAN 3,84	DEC 6,83	0.002	< 0.0001	0.0451	G 0.0191

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : CANBOROUGH/CUMULATIVE PRECIP.

PAGE : 1

REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
FEB 1,83	JAN 4,83	1255	1105	4	29.1	0	39256	3	1	64	C
MAR 1,83	FEB 1,83	1115	1155	3	41.0	0	39272	3	1	79	CD
MAR 29,83	MAR 1,83	1205	1210	4	99.4	0	39282	3	1	68	
APR 26,83	MAR 29,83	1220	1225	1	67.5	9	39297	3	1	49	CD
MAY 24,83	APR 26,83	1240	1030	1	92.0	0	39311	3	1	85	ACD
JUN 21,83	MAY 24,83	1040	1230	1	50.0	0	39324	3	1	U 26	ACF
JUL 19,83	JUN 21,83	1240	1120	1	95.0	0	39325	3	1	U 46	BCG
AUG 16,83	JUL 19,83	1125	1255	1	161.0	0	39336	3	1	74	AC
SEP 13,83	AUG 16,83	1255	1125	1	19.0	0	39342	3	1	51	AC
OCT 11,83	SEP 13,83	1125	1130	1	70.0	0	39347	2	1	76	AC H
NOV 8,83	OCT 11,83	1130	1130	1	87.0	0	39353	2	1	79	AC
DEC 6,83	NOV 8,83	1130	1240	3	120.2	9	39358	3	1	67	CB HCM
JAN 3,84	DEC 6,83	1240	1505	3	81.8	9	39362	3	1	U 36	CFM H

REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH0.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
FEB 1,83	JAN 4,83	607.0	57.5	4.06	0.1248	4.95	1.16	0.53
MAR 1,83	FEB 1,83	1060.0	38.0	4.27	0.0852	3.50	0.67	0.25
MAR 29,83	MAR 1,83	2223.0	22.5	4.49	0.0582	2.45	0.37	D 0.27
APR 26,83	MAR 29,83	1092.0	39.5	4.28	0.0904	4.40	0.58	0.35
MAY 24,83	APR 26,83	2564.0	36.3	4.32	0.0766	5.00	0.46	0.46
JUN 21,83	MAY 24,83	431.0	61.0	4.03	0.1376	7.20	0.86	0.47
JUL 19,83	JUN 21,83	1447.0	35.3	B 4.67	0.0512	6.85	0.56	0.79
AUG 16,83	JUL 19,83	3882.0	44.3	4.26	0.0992	5.55	0.57	0.42
SEP 13,83	AUG 16,83	318.0	50.5	B 7.64	0.0232	> 10.00	1.14	B 2.20
OCT 11,83	SEP 13,83	1747.0	*****	4.42	0.0718	5.15	0.59	0.52
NOV 8,83	OCT 11,83	A 2234.0	20.0	4.52	0.0500	2.90	0.35	0.20
DEC 6,83	NOV 8,83	2619.0	28.0	4.54	0.0578	4.10	0.59	0.34
JAN 3,84	DEC 6,83	958.0	18.4	G 5.19	0.0360	2.40	0.46	0.61

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : CANBOROUGH/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
FEB 1,83	JAN 4,83	0.52	1.42	0.160	0.040	0.160	1.240	0.016
MAR 1,83	FEB 1,83	0.30	0.72	0.080	0.020	0.135	0.660	0.012
MAR 29,83	MAR 1,83	0.17	0.80	0.055	0.025	0.065	0.540	0.027
APR 26,83	MAR 29,83	0.27	0.82	0.075	0.060	0.095	D 0.680	0.017
MAY 24,83	APR 26,83	0.20	D 0.95	0.100	0.065	0.085	0.810	0.011
JUN 21,83	MAY 24,83	0.17	1.22	0.120	<W 0.005	<W 0.005	1.130	0.010
JUL 19,83	JUN 21,83	0.23	G 1.95	0.245	B 0.685	0.030	1.300	D 0.074
AUG 16,83	JUL 19,83	0.16	0.82	0.100	0.040	0.030	0.840	0.014
SEP 13,83	AUG 16,83	B 0.44	G 3.25	B 0.720	B 0.440	D 0.095	1.430	G 0.128
OCT 11,83	SEP 13,83	0.13	0.85	0.130	0.050	0.025	0.800	0.010
NOV 8,83	OCT 11,83	0.14	0.68	0.060	0.030	0.045	0.590	0.014
DEC 6,83	NOV 8,83	0.40	D 1.85	0.085	U 0.270	0.095	0.018	U 0.057
JAN 3,84	DEC 6,83	0.61	D 0.58	0.210	0.035	G 0.295	D 0.570	0.019

REMOVAL DATE	EXPOSURE DATE	MANGANSE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
FEB 1,83	JAN 4,83	0.005	< 0.001	0.014	0.052	0.014	< 0.002	0.041
MAR 1,83	FEB 1,83	0.003	< 0.001	0.011	0.057	0.011	< 0.002	0.062
MAR 29,83	MAR 1,83	0.003	< 0.001	0.028	0.046	B 0.034	< 0.002	0.048
APR 26,83	MAR 29,83	0.004	< 0.001	0.009	0.080	0.007	< 0.002	0.090
MAY 24,83	APR 26,83	0.004	< 0.001	0.004	0.042	< 0.001	< 0.002	0.058
JUN 21,83	MAY 24,83	0.005	< 0.001	0.008	0.078	0.012	< 0.002	0.050
JUL 19,83	JUN 21,83	0.008	< 0.001	0.010	0.079	0.009	< 0.002	0.057
AUG 16,83	JUL 19,83	0.004	< 0.001	0.005	0.043	0.006	< 0.002	0.040
SEP 13,83	AUG 16,83	G 0.016	< 0.001	0.021	0.160	0.008	< 0.002	0.092
OCT 11,83	SEP 13,83	0.006	< 0.001	0.007	0.094	0.010	< 0.002	0.092
NOV 8,83	OCT 11,83	0.002	< 0.001	L 0.006	L 0.019	L 0.004	< 0.002	L 0.014
DEC 6,83	NOV 8,83	0.003	< 0.001	0.010	0.023	0.002	< 0.002	0.026
JAN 3,84	DEC 6,83	0.005	0.001	0.008	0.126	0.014	< 0.002	0.127

ONTARIO MINISTRY OF THE ENVIRONMENT
 CUMULATIVE SAMPLING ANALYSIS RESULTS
 APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : CANBOROUGH/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
FEB 1,83	JAN 4,83	0.002	0.0002	0.1170	0.0871
MAR 1,83	FEB 1,83	0.002	0.0001	0.0847	0.0537
MAR 29,83	MAR 1,83	< 0.001	0.0001	0.0560	0.0324
APR 26,83	MAR 29,83	0.002	< 0.0001	0.0873	0.0525
MAY 24,83	APR 26,83	0.001	< 0.0001	0.0753	0.0479
JUN 21,83	MAY 24,83	0.002	0.0001	0.1840	0.0933
JUL 19,83	JUN 21,83	0.001	< 0.0001	0.0458	B 0.0214
AUG 16,83	JUL 19,83	0.001	< 0.0001	0.0963	0.0550
SEP 13,83	AUG 16,83	0.004	0.0001	0.0146	B 0.0000
OCT 11,83	SEP 13,83	< 0.002	< 0.0001	0.0682	0.0380
NOV 8,83	OCT 11,83	L < 0.001	< 0.0001	0.0485	0.0302
DEC 6,83	NOV 8,83	< 0.001	0.0001	0.0555	0.0288
JAN 3,84	DEC 6,83	< 0.002	< 0.0001	0.0354	G 0.0065

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : DOG'S NEST EAST/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
FEB 1,83	JAN 4,83	1045	935	4	38.0	0	39257	3	1	60	C
MAR 1,83	FEB 1,83	945	945	3	45.0	0	39268	3	1	71	CD
MAR 29,83	MAR 1,83	955	1015	4	79.0	0	39281	3	1	73	
APR 26,83	MAR 29,83	1020	1520	1	42.6	9	39299	3	1	141	D
MAY 24,83	APR 26,83	1540	1250	1	100.0	0	39307	3	1	78	CD
JUN 21,83	MAY 24,83	1300	1420	1	42.0	0	39319	3	1	81	AC
JUL 19,83	JUN 21,83	1430	945	1	59.0	0	39328	3	1	76	AC
AUG 16,83	JUL 19,83	950	1140	1	214.0	0	39333	3	1	U 73	ACG CM
SEP 13,83	AUG 16,83	1140	945	1	30.0	0	39338	3	1	91	C HCM
OCT 11,83	SEP 13,83	945	920	1	53.0	0	39345	2	1	76	AC HM
NOV 8,83	OCT 11,83	920	910	1	75.0	0	39354	2	1	82	AC
DEC 6,83	NOV 8,83	910	1030	3	104.2	9	39359	3	1	U 53	CM M
JAN 3,84	DEC 13,83	1215	1130	3	87.0	0	39366	3	1	U 40	FM

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REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
FEB 1,83	JAN 4,83	744.0	45.7	4.02	0.1216	3.50	0.73	0.45
MAR 1,83	FEB 1,83	1046.0	32.8	4.27	G 0.1554	2.75	0.58	0.42
MAR 29,83	MAR 1,83	1898.0	27.6	4.34	0.0782	2.90	0.38	0.52
APR 26,83	MAR 29,83	1959.0	43.4	4.14	0.1082	4.05	D 0.62	0.50
MAY 24,83	APR 26,83	2554.0	36.6	4.24	0.0868	4.00	0.38	0.46
JUN 21,83	MAY 24,83	1105.0	53.8	4.04	0.1278	5.90	0.66	0.38
JUL 19,83	JUN 21,83	1456.0	34.8	4.24	0.0880	3.80	0.30	0.21
AUG 16,83	JUL 19,83	5120.0	48.8	4.14	0.1186	5.05	0.51	0.29
SEP 13,83	AUG 16,83	893.0	47.0	4.22	0.1084	5.80	0.62	0.40
OCT 11,83	SEP 13,83	1320.0	*****	4.38	0.0762	3.75	0.56	0.40
NOV 8,83	OCT 11,83	2000.0	23.4	4.37	0.0626	2.30	0.34	0.20
DEC 6,83	NOV 8,83	1805.0	29.6	4.27	B 0.1972	2.55	0.45	0.26
JAN 3,84	DEC 13,83	1155.0	18.8	4.59	0.0552	1.75	0.42	0.50

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : DOG'S NEST EAST/CUMULATIVE PRECIP.

PAGE : 2

REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
FEB 1,83	JAN 4,83	0.35	0.51	0.080	0.025	0.135	0.356	0.008
MAR 1,83	FEB 1,83	0.27	0.34	0.090	0.020	0.125	0.224	0.016
MAR 29,83	MAR 1,83	0.18	0.27	0.100	0.030	0.085	0.230	0.006
APR 26,83	MAR 29,83	0.25	0.34	0.085	0.045	0.080	0.222	0.010
MAY 24,83	APR 26,83	0.17	0.45	0.070	0.045	0.055	0.370	0.008
JUN 21,83	MAY 24,83	0.13	1.03	0.080	0.070	0.055	0.690	0.030
JUL 19,83	JUN 21,83	0.06	0.44	0.030	0.030	0.025	0.350	0.009
AUG 16,83	JUL 19,83	0.17	0.47	0.045	0.050	0.055	0.420	0.009
SEP 13,83	AUG 16,83	0.14	0.69	0.075	0.035	0.045	0.640	0.014
OCT 11,83	SEP 13,83	0.08	0.51	0.055	0.055	0.030	0.430	0.010
NOV 8,83	OCT 11,83	0.15	0.20	0.040	0.050	0.055	0.150	0.021
DEC 6,83	NOV 8,83	0.54	0.23	0.040	<T 0.010	0.085	0.164	0.010
JAN 3,84	DEC 13,83	0.22	0.16	0.125	<W 0.005	0.135	0.040	0.008

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REMOVAL DATE	EXPOSURE DATE	MANGANSE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
FEB 1,83	JAN 4,83	0.007	< 0.001	0.012	0.073	0.012	< 0.002	0.036
MAR 1,83	FEB 1,83	0.006	< 0.001	0.009	0.060	0.013	< 0.002	0.058
MAR 29,83	MAR 1,83	D 0.015	< 0.001	0.007	D 0.143	0.013	< 0.002	0.102
APR 26,83	MAR 29,83	D 0.008	< 0.001	0.007	0.081	0.006	< 0.002	0.122
MAY 24,83	APR 26,83	0.005	< 0.001	0.005	0.053	0.004	< 0.002	0.057
JUN 21,83	MAY 24,83	0.010	< 0.001	0.009	0.076	0.012	< 0.002	0.046
JUL 19,83	JUN 21,83	0.002	< 0.001	0.004	0.028	0.006	< 0.002	0.023
AUG 16,83	JUL 19,83	0.006	< 0.001	0.007	0.032	0.014	< 0.002	0.033
SEP 13,83	AUG 16,83	0.005	< 0.001	0.006	0.050	0.015	< 0.002	0.026
OCT 11,83	SEP 13,83	0.005	< 0.001	0.007	0.066	0.006	< 0.002	0.052
NOV 8,83	OCT 11,83	0.003	< 0.001	L 0.003	L 0.010	L 0.003	< 0.002	L 0.012
DEC 6,83	NOV 8,83	0.004	< 0.001	0.006	0.047	0.004	< 0.002	0.077
JAN 3,84	DEC 13,83	0.012	< 0.001	0.008	0.220	0.006	< 0.002	0.220

ONTARIO MINISTRY OF THE ENVIRONMENT
 CUMULATIVE SAMPLING ANALYSIS RESULTS
 APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : DOG'S NEST EAST/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
FEB 1,83	JAN 4,83	0.002	0.0001	0.1190	0.0955
MAR 1,83	FEB 1,83	0.001	< 0.0001	0.0422	0.0537
MAR 29,83	MAR 1,83	0.002	D 0.0002	0.0769	0.0457
APR 26,83	MAR 29,83	0.002	< 0.0001	0.1070	0.0724
MAY 24,83	APR 26,83	0.001	< 0.0001	0.0858	0.0575
JUN 21,83	MAY 24,83	0.002	< 0.0001	0.1270	0.0912
JUL 19,83	JUN 21,83	0.002	< 0.0001	0.0864	0.0575
AUG 16,83	JUL 19,83	0.002	0.0002	0.1170	0.0724
SEP 13,83	AUG 16,83	0.002	< 0.0001	0.1070	0.0603
OCT 11,83	SEP 13,83	< 0.002	< 0.0001	0.0725	0.0417
NOV 8,83	OCT 11,83	L< 0.001	< 0.0001	0.0612	0.0427
DEC 6,83	NOV 8,83	0.001	< 0.0001	0.1950	0.0537
JAN 3,84	DEC 13,83	< 0.002	< 0.0001	0.0547	0.0257

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : NORTH DUFFERIN/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
FEB 1,83	JAN 4,83	1435	1430	4	27.0	0	39254	3	1	66	
MAR 1,83	FEB 1,83	1440	1245	3	49.0	0	39270	3	1	69	CD
MAR 29,83	MAR 1,83	1255	1410	4	72.0	0	39278	3	1	63	ACDG
APR 26,83	MAR 29,83	1420	1430	1	64.0	0	39298	3	1	80	A
MAY 24,83	APR 26,83	1445	1145	1	103.0	0	39308	3	1	77	CD
JUN 21,83	MAY 24,83	1155	1035	1	43.0	0	39323	3	1	69	AC
JUL 19,83	JUN 21,83	1045	1445	1	76.0	0	39326	3	1	74	CG
AUG 16,83	JUL 19,83	1500	1515	1	190.0	0	39335	3	1	80	AC
SEP 13,83	AUG 16,83	1515	1315	1	31.0	0	39339	3	1	94	ACG
OCT 11,83	SEP 13,83	1315	1150	1	77.0	0	39344	2	1	72	AC
NOV 8,83	OCT 11,83	1150	1250	1	69.0	0	39352	2	1	81	C
DEC 6,83	NOV 8,83	1250	945	3	111.0	9	39357	3	1	65	C
JAN 3,84	DEC 6,83	945	1005	3	86.0	9	39365	3	1	74	C

REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
FEB 1,83	JAN 4,83	583.0	46.5	4.09	0.1080	4.75	0.82	0.85
MAR 1,83	FEB 1,83	1111.0	54.5	4.02	G 0.1652	4.40	0.81	0.33
MAR 29,83	MAR 1,83	1480.0	29.8	4.33	0.0784	2.95	0.38	0.47
APR 26,83	MAR 29,83	1677.0	40.1	4.23	0.0946	4.00	0.56	0.66
MAY 24,83	APR 26,83	2595.0	37.8	4.25	0.0866	4.45	0.41	0.44
JUN 21,83	MAY 24,83	965.0	55.0	4.15	0.1186	6.30	0.71	0.48
JUL 19,83	JUN 21,83	1834.0	44.5	4.15	0.0942	5.80	0.47	0.47
AUG 16,83	JUL 19,83	4971.0	35.3	4.45	0.0750	4.85	0.53	0.56
SEP 13,83	AUG 16,83	951.0	*****	*****	*****	*****	*****	*****
OCT 11,83	SEP 13,83	1806.0	*****	4.28	0.0944	4.70	0.62	0.46
NOV 8,83	OCT 11,83	1833.0	23.9	4.37	0.0622	2.45	0.30	0.26
DEC 6,83	NOV 8,83	2346.0	25.8	4.38	0.0700	2.80	D 0.24	0.31
JAN 3,84	DEC 6,83	2082.0	19.8	4.47	0.0596	1.60	0.31	0.15

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : NORTH DUFFERIN/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
FEB 1,83	JAN 4,83	0.44	0.80	0.185	0.030	0.160	0.620	0.004
MAR 1,83	FEB 1,83	0.34	0.49	0.065	0.015	0.155	0.420	0.012
MAR 29,83	MAR 1,83	0.21	0.36	0.080	0.025	0.085	0.298	0.006
APR 26,83	MAR 29,83	0.28	0.71	D 0.180	0.060	0.100	0.318	D 0.037
MAY 24,83	APR 26,83	0.17	0.55	0.090	0.075	0.105	0.470	0.010
JUN 21,83	MAY 24,83	0.16	0.95	0.125	0.095	0.045	0.830	0.016
JUL 19,83	JUN 21,83	0.10	0.90	0.120	0.110	0.025	0.740	0.015
AUG 16,83	JUL 19,83	0.15	1.23	0.100	D 0.145	0.055	0.770	B 0.117
SEP 13,83	AUG 16,83	*****	*****	*****	*****	*****	1.290	*****
OCT 11,83	SEP 13,83	*****	0.44	0.070	0.035	0.015	0.440	0.004
NOV 8,83	OCT 11,83	0.18	0.26	0.060	0.025	0.050	0.208	0.017
DEC 6,83	NOV 8,83	0.24	0.40	0.070	0.020	0.045	0.346	0.005
JAN 3,84	DEC 6,83	0.21	0.17	0.050	<T 0.005	0.055	0.110	0.008

REMOVAL DATE	EXPOSURE DATE	MANGANSE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
FEB 1,83	JAN 4,83	0.004	< 0.001	0.012	0.052	0.014	< 0.002	0.034
MAR 1,83	FEB 1,83	0.003	< 0.001	0.007	0.038	0.008	< 0.002	0.047
MAR 29,83	MAR 1,83	0.004	< 0.001	0.006	0.052	0.010	< 0.002	0.046
APR 26,83	MAR 29,83	0.004	< 0.001	0.007	0.053	0.007	< 0.002	0.070
MAY 24,83	APR 26,83	0.004	< 0.001	0.005	0.060	0.003	< 0.002	0.054
JUN 21,83	MAY 24,83	0.006	< 0.001	0.011	0.083	0.008	< 0.002	0.046
JUL 19,83	JUN 21,83	0.004	< 0.001	0.006	0.041	0.008	< 0.002	0.033
AUG 16,83	JUL 19,83	0.007	< 0.001	0.007	0.054	0.006	< 0.002	0.050
SEP 13,83	AUG 16,83	0.013	< 0.001	0.014	G 0.234	G 0.022	< 0.002	G 0.177
OCT 11,83	SEP 13,83	0.006	< 0.001	0.008	0.115	0.006	< 0.002	0.089
NOV 8,83	OCT 11,83	0.002	< 0.001	L 0.016	L 0.020	L 0.004	< 0.002	L 0.020
DEC 6,83	NOV 8,83	0.002	< 0.001	0.005	0.022	0.005	< 0.002	0.030
JAN 3,84	DEC 6,83	0.002	< 0.001	0.004	0.049	0.003	< 0.002	0.057

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : NORTH DUFFERIN/CUMULATIVE PRECIP.

PAGE : 3

REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
FEB 1,83	JAN 4,83	0.002	0.0001	0.1040	0.0813
MAR 1,83	FEB 1,83	< 0.002	< 0.0001	0.1610	0.0955
MAR 29,83	MAR 1,83	< 0.002	< 0.0001	0.0770	0.0468
APR 26,83	MAR 29,83	< 0.002	< 0.0001	0.0943	0.0589
MAY 24,83	APR 26,83	0.001	< 0.0001	0.0857	0.0562
JUN 21,83	MAY 24,83	< 0.002	< 0.0001	0.1160	0.0708
JUL 19,83	JUN 21,83	0.001	< 0.0001	0.0914	0.0708
AUG 16,83	JUL 19,83	0.003	< 0.0001	0.0733	0.0355
SEP 13,83	AUG 16,83	0.003	< 0.0001	*****	*****
OCT 11,83	SEP 13,83	< 0.002	< 0.0001	0.0918	0.0525
NOV 8,83	OCT 11,83	< 0.001	< 0.0001	0.0609	0.0427
DEC 6,83	NOV 8,83	0.001	< 0.0001	0.0690	0.0417
JAN 3,84	DEC 6,83	< 0.001	0.0001	0.0593	0.0339

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : SOUTH CANFIELD/CUMULATIVE PRECIP.

PAGE : 1

REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
FEB 1,83	JAN 4,83	1225	1030	4	30.8	0	39258	3	1	69	C
MAR 1,83	FEB 1,83	1040	1125	3	41.0	0	39274	3	1	65	CD
MAR 29,83	MAR 1,83	1135	1130	4	81.0	0	39280	3	1	72	ACD HCM
APR 26,83	MAR 29,83	1140	1120	1	56.6	9	39295	3	1	48	D
MAY 24,83	APR 26,83	1130	1000	1	86.0	0	39312	3	1	81	CD
JUN 21,83	MAY 24,83	1010	1315	1	41.0	0	39320	3	1	88	AC
JUL 19,83	JUN 21,83	1325	1045	1	71.0	0	39330	3	1	68	AC
AUG 16,83	JUL 19,83	1045	1230	1	134.0	0	39334	3	1	82	AC M
SEP 13,83	AUG 16,83	1230	1100	1	39.0	0	39341	3	1	71	ACD
OCT 11,83	SEP 13,83	1100	1005	1	65.0	0	39343	2	1	76	C HM
NOV 8,83	OCT 11,83	1005	1010	1	82.0	0	39349	2	1	72	AC
DEC 6,83	NOV 8,83	1010	1205	3	109.3	9	39356	3	1	U 48	CM
JAN 3,84	DEC 16,83	1500	1445	3	39.9	9	39361	3	1	U 75	CFMG

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REMOVAL DATE	EXPOSURE DATE	VOLUME HL	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
FEB 1,83	JAN 4,83	693.0	50.0	4.05	0.1228	4.45	1.01	0.87
MAR 1,83	FEB 1,83	873.0	38.5	4.15	0.1034	3.25	0.62	0.42
MAR 29,83	MAR 1,83	1906.0	14.1	U 6.83	U 0.0266	2.40	0.34	0.45
APR 26,83	MAR 29,83	895.0	44.2	4.17	0.1068	4.25	0.57	0.45
MAY 24,83	APR 26,83	2285.0	42.5	4.15	0.1010	4.65	0.43	0.43
JUN 21,83	MAY 24,83	1182.0	60.0	4.05	0.1394	6.55	0.72	0.29
JUL 19,83	JUN 21,83	1580.0	48.5	4.03	0.1148	5.60	0.47	0.35
AUG 16,83	JUL 19,83	3586.0	62.0	4.02	0.1524	6.30	U 0.69	0.36
SEP 13,83	AUG 16,83	911.0	36.0	4.25	0.0852	4.60	0.45	0.30
OCT 11,83	SEP 13,83	1613.0	*****	4.33	0.0892	3.95	0.49	0.32
NOV 8,83	OCT 11,83	1927.0	*****	4.41	0.0634	*****	*****	*****
DEC 6,83	NOV 8,83	1712.0	27.3	4.34	0.0740	2.65	0.50	0.25
JAN 3,84	DEC 16,83	974.0	*****	G 5.33	*****	*****	*****	*****

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : SOUTH CANFIELD/CUMULATIVE PRECIP.

PAGE : 2

REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
FEB 1,83	JAN 4,83	G 0.76	0.66	0.295	0.035	0.205	0.500	0.014
MAR 1,83	FEB 1,83	0.40	0.37	0.130	0.015	0.220	0.266	0.017
MAR 29,83	MAR 1,83	0.26	1.04	0.120	U 0.100	0.160	0.560	0.041
APR 26,83	MAR 29,83	0.25	0.38	0.105	0.055	0.100	0.244	0.015
MAY 24,83	APR 26,83	0.19	0.61	0.095	0.055	0.070	0.420	0.010
JUN 21,83	MAY 24,83	0.15	0.98	0.070	0.085	0.045	0.770	0.021
JUL 19,83	JUN 21,83	0.11	0.62	0.090	0.040	0.025	0.520	0.007
AUG 16,83	JUL 19,83	0.18	0.57	0.070	0.030	0.035	0.500	0.007
SEP 13,83	AUG 16,83	0.15	0.68	0.100	0.040	0.040	0.590	0.018
OCT 11,83	SEP 13,83	0.17	0.29	0.070	0.030	0.020	0.274	0.008
NOV 8,83	OCT 11,83	*****	1.10	*****	*****	*****	0.292	B 0.120
DEC 6,83	NOV 8,83	0.32	0.39	0.065	<T 0.010	0.140	0.248	0.018
JAN 3,84	DEC 16,83	*****	*****	*****	*****	*****	*****	*****

REMOVAL DATE	EXPOSURE DATE	MANGANSE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
FEB 1,83	JAN 4,83	0.006	< 0.001	0.013	0.065	0.017	< 0.002	0.054
MAR 1,83	FEB 1,83	< 0.001	< 0.001	0.006	0.039	0.012	< 0.002	0.042
MAR 29,83	MAR 1,83	0.004	< 0.001	0.005	0.043	0.008	< 0.002	0.073
APR 26,83	MAR 29,83	0.004	< 0.001	0.005	0.073	0.006	< 0.002	0.103
MAY 24,83	APR 26,83	0.005	< 0.001	0.004	0.058	0.003	< 0.002	0.062
JUN 21,83	MAY 24,83	0.005	< 0.001	0.009	0.056	0.008	< 0.002	0.037
JUL 19,83	JUN 21,83	0.004	< 0.001	0.005	0.037	0.007	< 0.002	0.036
AUG 16,83	JUL 19,83	0.004	< 0.001	0.005	0.047	0.007	< 0.002	0.046
SEP 13,83	AUG 16,83	0.003	0.001	0.005	0.027	0.016	< 0.002	0.025
OCT 11,83	SEP 13,83	0.004	< 0.001	0.006	0.094	0.008	< 0.002	0.075
NOV 8,83	OCT 11,83	*****	*****	*****	*****	*****	*****	*****
DEC 6,83	NOV 8,83	0.002	< 0.001	0.007	0.023	0.006	< 0.002	0.030
JAN 3,84	DEC 16,83	*****	*****	*****	*****	*****	*****	*****

ONTARIO MINISTRY OF THE ENVIRONMENT
 CUMULATIVE SAMPLING ANALYSIS RESULTS
 APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : SOUTH CANFIELD/CUMULATIVE PRECIP.

PAGE : 3

REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
FEB 1,83	JAN 4,83	0.002	0.0001	0.1200	0.0891
MAR 1,83	FEB 1,83	0.002	< 0.0001	0.0981	0.0708
MAR 29,83	MAR 1,83	< 0.002	< 0.0001	0.0226	U 0.0001
APR 26,83	MAR 29,83	< 0.002	< 0.0001	0.1050	0.0676
MAY 24,83	APR 26,83	0.001	< 0.0001	0.0995	0.0708
JUN 21,83	MAY 24,83	< 0.002	0.0001	0.1370	0.0891
JUL 19,83	JUN 21,83	< 0.002	D 0.0002	0.1130	0.0933
AUG 16,83	JUL 19,83	0.002	< 0.0001	0.1520	0.0955
SEP 13,83	AUG 16,83	0.002	< 0.0001	0.0836	0.0562
OCT 11,83	SEP 13,83	< 0.002	< 0.0001	0.0869	0.0468
NOV 8,83	OCT 11,83	*****	*****	0.0624	0.0389
DEC 6,83	NOV 8,83	< 0.002	< 0.0001	0.0732	0.0457
JAN 3,84	DEC 16,83	*****	*****	*****	G 0.0047

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : VILLA NOVA/CUMULATIVE PRECIP.

PAGE : 1

REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
FEB 1,83	JAN 4,83	1520	1507	4	32.0	0	39253	3	1	73	C
MAR 1,83	FEB 1,83	1525	905	3	47.0	0	39266	3	1	76	DC
MAR 29,83	MAR 1,83	915	1500	4	78.2	0	39277	3	1	62	ACD
APR 26,83	MAR 29,83	1510	1525	1	57.0	0	39300	3	1	92	ACD
MAY 24,83	APR 26,83	1535	1220	1	99.0	0	39310	3	1	U 80	ACDFI
JUN 21,83	MAY 24,83	1230	935	1	35.0	0	39321	3	1	76	C
JUL 19,83	JUN 21,83	940	1530	1	77.0	0	39327	3	1	U 97	ACFJG
AUG 16,83	JUL 19,83	1535	1105	1	248.0	0	39331	3	1	U 93	ACFJ HCM
SEP 13,83	AUG 16,83	1105	1410	1	51.0	0	39337	3	1	81	AC
OCT 11,83	SEP 13,83	1410	1230	1	56.0	0	39346	2	1	81	AC
NOV 8,83	OCT 11,83	1230	1325	1	73.0	0	39350	2	1	74	ABC H
DEC 6,83	NOV 8,83	1325	1110	3	105.9	9	39355	3	1	U 72	CFJ
JAN 3,84	DEC 6,83	1110	1035	3	85.8	9	39363	3	1	U 19	CFH

REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
FEB 1,83	JAN 4,83	762.0	45.7	4.03	0.1124	3.85	0.79	0.43
MAR 1,83	FEB 1,83	1168.0	50.0	4.12	G 0.1812	4.00	0.76	0.37
MAR 29,83	MAR 1,83	1599.0	28.1	4.34	0.0720	3.00	0.38	0.47
APR 26,83	MAR 29,83	1713.0	39.0	4.22	0.0974	3.80	0.56	0.46
MAY 24,83	APR 26,83	2591.0	37.9	4.27	0.0874	4.20	0.39	0.35
JUN 21,83	MAY 24,83	874.0	55.0	4.07	0.1292	5.90	0.66	0.41
JUL 19,83	JUN 21,83	2428.0	35.0	4.24	0.0852	4.55	0.38	0.34
AUG 16,83	JUL 19,83	7512.0	43.4	4.26	0.1014	4.35	0.50	0.30
SEP 13,83	AUG 16,83	1348.0	34.5	4.39	0.0712	4.65	0.51	0.48
OCT 11,83	SEP 13,83	1482.0	*****	4.17	0.0966	4.90	0.66	0.52
NOV 8,83	OCT 11,83	1775.0	20.3	U 4.93	U 0.0326	3.60	0.24	G 1.14
DEC 6,83	NOV 8,83	2491.0	28.0	4.33	0.0748	2.75	0.48	0.25
JAN 3,84	DEC 6,83	555.0	21.6	4.44	0.0668	1.90	0.24	0.23

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : VILLA NOVA/CUMULATIVE PRECIP.

PAGE : 2

REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIUM MG/L	POTASSIUM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
FEB 1,83	JAN 4,83	0.38	0.68	0.095	0.020	0.140	0.560	0.010
MAR 1,83	FEB 1,83	0.44	0.53	0.080	0.025	0.155	0.362	0.013
MAR 29,83	MAR 1,83	0.20	0.40	0.090	0.035	0.100	0.294	0.016
APR 26,83	MAR 29,83	D 0.21	0.45	0.085	0.050	0.085	0.280	0.020
MAY 24,83	APR 26,83	0.17	0.55	0.080	0.055	0.050	0.490	0.009
JUN 21,83	MAY 24,83	0.13	0.72	0.080	0.040	0.035	0.610	0.012
JUL 19,83	JUN 21,83	0.07	0.72	0.060	0.075	0.050	0.660	0.014
AUG 16,83	JUL 19,83	0.17	0.50	0.050	0.055	0.035	0.410	0.010
SEP 13,83	AUG 16,83	0.13	0.74	0.115	0.040	0.040	0.670	0.013
OCT 11,83	SEP 13,83	0.11	0.62	0.100	0.075	0.015	0.500	0.011
NOV 8,83	OCT 11,83	0.32	0.30	0.245	B 0.470	0.065	0.068	0.049
DEC 6,83	NOV 8,83	0.29	0.34	0.045	0.020	0.080	0.270	0.011
JAN 3,84	DEC 6,83	0.38	0.19	0.065	<T 0.005	0.130	0.010	0.031

REMOVAL DATE	EXPOSURE DATE	MANGANESE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
FEB 1,83	JAN 4,83	0.005	< 0.001	0.011	0.046	B 0.028	< 0.002	0.035
MAR 1,83	FEB 1,83	0.003	< 0.001	0.007	0.053	0.009	< 0.002	0.058
MAR 29,83	MAR 1,83	0.004	< 0.001	0.006	0.050	0.010	< 0.002	0.046
APR 26,83	MAR 29,83	0.005	< 0.001	0.006	0.062	0.007	< 0.002	0.074
MAY 24,83	APR 26,83	0.004	< 0.001	0.005	0.040	0.004	< 0.002	0.049
JUN 21,83	MAY 24,83	0.007	< 0.001	0.006	0.067	0.010	< 0.002	0.055
JUL 19,83	JUN 21,83	0.004	0.001	0.005	0.051	0.009	< 0.002	0.042
AUG 16,83	JUL 19,83	0.004	0.001	0.007	0.063	0.013	< 0.002	0.056
SEP 13,83	AUG 16,83	0.005	< 0.001	0.006	0.045	0.014	< 0.002	0.030
OCT 11,83	SEP 13,83	0.007	< 0.001	0.011	0.090	0.012	< 0.002	0.085
NOV 8,83	OCT 11,83	0.005	0.001	L 0.006	L 0.050	L 0.007	< 0.002	L 0.042
DEC 6,83	NOV 8,83	0.003	< 0.001	0.006	0.037	0.006	< 0.002	0.050
JAN 3,84	DEC 6,83	0.005	< 0.001	0.006	0.096	0.004	< 0.002	0.112

ONTARIO MINISTRY OF THE ENVIRONMENT
 CUMULATIVE SAMPLING ANALYSIS RESULTS
 APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : VILLA NOVA/CUMULATIVE PRECIP.

PAGE : 3

REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
FEB 1,83	JAN 4,83	0.002	0.0002	0.1080	0.0933
MAR 1,83	FEB 1,83	< 0.002	D 0.0002	0.0535	0.0759
MAR 29,83	MAR 1,83	< 0.002	< 0.0001	0.0705	0.0457
APR 26,83	MAR 29,83	0.001	< 0.0001	0.0956	0.0603
MAY 24,83	APR 26,83	0.002	0.0001	0.0863	0.0537
JUN 21,83	MAY 24,83	0.004	< 0.0001	0.1260	0.0851
JUL 19,83	JUN 21,83	0.001	0.0001	0.0849	0.0575
AUG 16,83	JUL 19,83	0.003	D 0.0005	0.1000	0.0550
SEP 13,83	AUG 16,83	< 0.002	< 0.0001	0.0690	0.0407
OCT 11,83	SEP 13,83	0.001	< 0.0001	0.0948	0.0676
NOV 8,83	OCT 11,83	L 0.001	< 0.0001	0.0321	U 0.0117
DEC 6,83	NOV 8,83	< 0.001	< 0.0001	0.0741	0.0468
JAN 3,84	DEC 6,83	0.004	< 0.0001	0.0667	0.0363

PART IV

1983 SUDBURY REGION

CUMULATIVE PRECIPITATION CHEMISTRY LISTINGS

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : BURWASH/CUMULATIVE PRECIP.

PAGE : 1

REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
FEB 1,83	JAN 5,83	900	1420	4	40.5	0	11506	3	1	U 90	FJ M
MAR 1,83	FEB 1,83	1420	1100	4	26.5	0	11535	3	1	U 74	F
MAR 29,83	MAR 1,83	1100	1210	4	80.5	0	11578	3	1	62	
APR 26,83	MAR 29,83	1210	1055	1	60.0	9	11590	2	1	U 101	GA
MAY 24,83	APR 26,83	1055	1345	1	130.0	0	11622	2	1	U 82	AJF
JUN 21,83	MAY 24,83	1345	920	1	24.0	0	11652	2	1	U 116	ACFJ
JUL 19,83	JUN 21,83	920	1415	1	28.0	0	11674	2	1	80	
AUG 16,83	JUL 19,83	1415	1000	1	93.0	0	11699	2	1	82	
SEP 13,83	AUG 16,83	1000	1030	1	46.0	0	11700	2	1	74	
OCT 11,83	SEP 13,83	1030	1350	1	119.0	0	11713	2	1	90	HM
NOV 8,83	OCT 11,83	1350	840	1	45.6	9	11727	2	1	82	
DEC 6,83	NOV 8,83	840	1040	4	34.7	0	11741	2	1	143	N

REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
FEB 1,83	JAN 5,83	1194.0	41.2	4.22	0.1062	2.70	0.81	0.10
MAR 1,83	FEB 1,83	643.0	G 64.0	3.89	G 0.1568	4.60	1.16	0.12
MAR 29,83	MAR 1,83	1643.0	32.6	4.26	0.0816	3.10	0.51	0.16
APR 26,83	MAR 29,83	1971.0	37.1	4.21	0.0952	3.45	0.37	0.15
MAY 24,83	APR 26,83	3470.0	31.1	4.26	0.0800	2.80	0.35	0.11
JUN 21,83	MAY 24,83	908.0	G 122.0	3.67	G 0.2780	G 14.20	G 1.23	0.63
JUL 19,83	JUN 21,83	730.0	31.7	4.38	0.0768	3.95	0.35	0.29
AUG 16,83	JUL 19,83	2504.0	49.8	D 4.12	0.1280	6.10	0.53	0.26
SEP 13,83	AUG 16,83	1117.0	18.5	G 4.57	0.0454	2.55	0.24	0.24
OCT 11,83	SEP 13,83	3491.0	*****	4.50	0.0636	2.70	0.35	0.13
NOV 8,83	OCT 11,83	1216.0	35.0	4.11	0.0996	2.95	0.61	0.10
DEC 6,83	NOV 8,83	1617.0	30.1	4.20	0.0832	2.65	0.53	0.09

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : BURWASH/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
FEB 1,83	JAN 5,83	G 1.30	0.37	<W 0.005	0.015	1.000	0.278	0.005
MAR 1,83	FEB 1,83	G 1.31	0.58	0.025	0.020	G 1.150	0.580	<T 0.001
MAR 29,83	MAR 1,83	D 0.24	0.50	0.030	0.050	D 0.180	0.376	0.023
APR 26,83	MAR 29,83	0.21	0.34	0.025	0.045	0.055	0.320	0.011
MAY 24,83	APR 26,83	0.06	0.40	0.025	D 0.030	0.010	0.290	D 0.008
JUN 21,83	MAY 24,83	G 0.33	1.82	0.140	0.130	B 0.450	G 1.450	0.039
JUL 19,83	JUN 21,83	0.09	0.55	0.040	0.075	0.035	0.490	0.010
AUG 16,83	JUL 19,83	0.14	0.73	0.070	0.060	0.060	0.700	0.010
SEP 13,83	AUG 16,83	0.26	0.40	0.025	0.065	0.200	0.354	0.009
OCT 11,83	SEP 13,83	0.14	0.26	0.020	<T 0.015	0.025	0.236	0.006
NOV 8,83	OCT 11,83	0.16	0.19	0.015	0.020	0.060	0.152	0.005
DEC 6,83	NOV 8,83	0.30	0.30	0.020	<T 0.015	0.200	0.256	<T 0.004

REMOVAL DATE	EXPOSURE DATE	MANGANESE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
FEB 1,83	JAN 5,83	0.001	< 0.001	0.006	0.046	0.011	< 0.002	0.026
MAR 1,83	FEB 1,83	0.003	0.002	0.021	0.147	0.019	< 0.002	0.060
MAR 29,83	MAR 1,83	0.002	< 0.001	0.006	0.054	0.007	< 0.002	0.052
APR 26,83	MAR 29,83	0.001	< 0.001	0.006	0.038	0.007	< 0.002	0.039
MAY 24,83	APR 26,83	0.002	< 0.001	0.005	0.055	0.007	< 0.002	0.020
JUN 21,83	MAY 24,83	0.012	G 0.015	0.015	0.138	0.022	< 0.002	0.088
JUL 19,83	JUN 21,83	0.004	< 0.001	0.009	0.182	0.008	< 0.002	0.072
AUG 16,83	JUL 19,83	0.003	0.001	0.007	0.038	0.007	< 0.002	D 0.027
SEP 13,83	AUG 16,83	0.002	< 0.001	0.005	0.031	0.012	< 0.002	0.033
OCT 11,83	SEP 13,83	0.002	0.003	0.004	0.102	0.006	< 0.002	0.106
NOV 8,83	OCT 11,83	0.001	< 0.001	L 0.011	L 0.011	L 0.006	< 0.002	L 0.014
DEC 6,83	NOV 8,83	0.002	< 0.001	0.006	0.036	0.008	< 0.002	0.035

ONTARIO MINISTRY OF THE ENVIRONMENT
 CUMULATIVE SAMPLING ANALYSIS RESULTS
 APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : BURWASH/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
FEB 1,83	JAN 5,83	0.001	0.0003	0.1060	0.0603
MAR 1,83	FEB 1,83	0.006	0.0006	0.1530	0.1288
MAR 29,83	MAR 1,83	< 0.002	0.0001	0.0819	0.0550
APR 26,83	MAR 29,83	0.002	< 0.0001	0.0923	0.0617
MAY 24,83	APR 26,83	0.004	< 0.0001	0.0791	0.0550
JUN 21,83	MAY 24,83	0.024	0.0006	0.2730	0.2138
JUL 19,83	JUN 21,83	0.002	0.0001	0.0752	0.0417
AUG 16,83	JUL 19,83	0.002	0.0002	0.1270	D 0.0759
SEP 13,83	AUG 16,83	0.003	< 0.0001	0.0447	G 0.0269
OCT 11,83	SEP 13,83	0.004	0.0002	0.0607	0.0316
NOV 8,83	OCT 11,83	L 0.004	< 0.0001	0.0986	0.0776
DEC 6,83	NOV 8,83	0.001	< 0.0001	0.0824	0.0631

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : HANMER/CUMULATIVE PRECIP.

PAGE : 1

REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
FEB 1,83	JAN 4,83	1230	1040	4	17.4	0	11508	3	1	76	
MAR 1,83	FEB 1,83	1040	930	4	16.1	0	11539	3	1	85	
MAR 29,83	MAR 1,83	930	1058	4	49.5	0	11576	3	1	U 25	F
APR 26,83	MAR 29,83	1058	1410	1	36.0	0	11592	2	1	U 74	G
MAY 24,83	APR 26,83	1410	955	1	91.0	0	11618	2	1	70	A
JUN 21,83	MAY 24,83	955	1440	1	47.0	0	11648	2	1	58	
JUL 19,83	JUN 21,83	1440	1150	1	20.0	0	11676	2	1	27	N
AUG 16,83	JUL 19,83	1150	1405	1	67.0	0	11697	2	1	86	
SEP 13,83	AUG 16,83	1405	1400	1	72.0	0	11702	2	1	66	A
OCT 11,83	SEP 13,83	1400	1015	1	113.0	0	11715	2	1	44	NHM
NOV 8,83	OCT 11,83	1015	1000	1	38.4	9	11729	2	1	54	M
DEC 6,83	NOV 8,83	1000	930	4	24.0	0	11743	2	1	85	
JAN 3,84	DEC 6,83	1040	1130	2	59.8	0	11756	2	1	U 80	G

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REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
FEB 1,83	JAN 4,83	432.0	44.0	4.09	0.1316	3.50	0.83	0.23
MAR 1,83	FEB 1,83	445.0	G 63.0	3.90	G 0.1646	4.85	1.15	0.24
MAR 29,83	MAR 1,83	U 408.0	49.5	4.05	0.1276	4.60	0.75	0.32
APR 26,83	MAR 29,83	865.0	38.4	4.17	0.0996	3.75	0.41	0.16
MAY 24,83	APR 26,83	2075.0	38.5	4.21	0.0944	3.85	0.41	0.19
JUN 21,83	MAY 24,83	889.0	G 90.0	3.80	G 0.2120	10.10	0.74	0.48
JUL 19,83	JUN 21,83	178.0	*****	*****	*****	> 10.00	G 1.18	*****
AUG 16,83	JUL 19,83	1882.0	G 98.0	G 7.66	G 0.2160	5.00	0.02	0.24
SEP 13,83	AUG 16,83	1566.0	51.0	4.03	D 0.1160	D 6.20	0.29	0.25
OCT 11,83	SEP 13,83	1619.0	*****	4.35	0.0782	3.25	0.30	0.11
NOV 8,83	OCT 11,83	680.0	46.0	4.07	0.1200	5.15	0.61	0.23
DEC 6,83	NOV 8,83	667.0	50.0	3.99	D 0.1396	5.10	0.78	0.24
JAN 3,84	DEC 6,83	1565.0	*****	*****	*****	*****	*****	*****

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : HANMER/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
FEB 1,83	JAN 4,83	0.77	0.45	0.055	0.110	0.635	D 0.314	0.014
MAR 1,83	FEB 1,83	0.61	0.69	0.040	D 0.140	0.525	0.620	0.009
MAR 29,83	MAR 1,83	0.33	0.67	0.030	0.060	0.280	0.450	0.019
APR 26,83	MAR 29,83	0.12	0.34	0.025	0.030	0.100	0.280	0.005
MAY 24,83	APR 26,83	0.09	0.49	0.040	0.030	0.025	0.450	0.007
JUN 21,83	MAY 24,83	0.19	1.86	0.110	0.130	0.030	0.960	G 0.065
JUL 19,83	JUN 21,83	G 0.42	1.41	*****	*****	*****	*****	G 0.095
AUG 16,83	JUL 19,83	G 0.92	G 11.50	0.145	G 2.910	G 0.845	> 2.000	G 1.190
SEP 13,83	AUG 16,83	0.06	0.37	0.030	0.040	0.050	0.314	0.009
OCT 11,83	SEP 13,83	<W 0.01	0.31	0.015	<T 0.015	0.015	0.264	<T 0.002
NOV 8,83	OCT 11,83	0.16	0.49	0.045	0.100	0.070	0.366	0.030
DEC 6,83	NOV 8,83	1.10	0.49	0.050	0.025	0.730	0.360	0.019
JAN 3,84	DEC 6,83	*****	*****	*****	*****	*****	*****	*****

REMOVAL DATE	EXPOSURE DATE	MANGANSE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
FEB 1,83	JAN 4,83	0.004	0.007	0.128	0.095	0.017	< 0.002	0.065
MAR 1,83	FEB 1,83	0.006	0.008	0.032	0.252	0.023	< 0.002	0.095
MAR 29,83	MAR 1,83	0.004	0.001	0.012	0.069	0.009	< 0.002	0.102
APR 26,83	MAR 29,83	0.002	0.002	0.005	0.039	0.008	< 0.002	0.045
MAY 24,83	APR 26,83	0.003	0.003	0.006	0.052	0.005	< 0.002	0.032
JUN 21,83	MAY 24,83	0.010	0.010	0.012	0.122	0.018	< 0.002	0.093
JUL 19,83	JUN 21,83	G 0.037	G 0.045	B 0.062	G 1.784	B 0.032	0.002	B 0.731
AUG 16,83	JUL 19,83	0.004	0.004	G 0.122	0.075	0.014	< 0.002	0.058
SEP 13,83	AUG 16,83	0.003	0.003	0.008	0.082	0.010	< 0.002	0.049
OCT 11,83	SEP 13,83	0.002	0.009	0.006	0.096	0.012	< 0.002	0.057
NOV 8,83	OCT 11,83	0.005	0.006	L 0.014	L 0.074	L 0.018	< 0.002	L 0.080
DEC 6,83	NOV 8,83	0.009	0.008	0.028	0.391	0.025	< 0.002	G 0.330
JAN 3,84	DEC 6,83	*****	*****	*****	*****	*****	*****	*****

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : HANMER/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
FEB 1,83	JAN 4,83	0.009	G 0.0028	0.1300	0.0813
MAR 1,83	FEB 1,83	0.011	B 0.0028	0.1610	0.1259
MAR 29,83	MAR 1,83	0.003	0.0005	0.1290	0.0891
APR 26,83	MAR 29,83	0.006	0.0004	0.0984	0.0676
MAY 24,83	APR 26,83	0.005	0.0002	0.0942	0.0617
JUN 21,83	MAY 24,83	0.015	0.0005	0.2110	0.1585
JUL 19,83	JUN 21,83	B 0.069	0.0007	*****	*****
AUG 16,83	JUL 19,83	0.011	0.0001	0.1880	G 0.0000
SEP 13,83	AUG 16,83	0.011	0.0005	0.1140	0.0933
OCT 11,83	SEP 13,83	0.019	0.0004	0.0758	0.0447
NOV 8,83	OCT 11,83	L 0.018	0.0006	0.1180	0.0851
DEC 6,83	NOV 8,83	0.016	0.0008	0.1380	0.1023
JAN 3,84	DEC 6,83	*****	*****	*****	*****

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : LIVELY/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
FEB 1,83	JAN 4,83	1135	800	4	33.7	0	11510	3	1	U 51	G
MAR 1,83	FEB 1,83	800	815	4	29.1	0	11537	3	1	72	
MAR 29,83	MAR 1,83	815	800	4	75.4	0	11577	3	1	U 50	G
APR 26,83	MAR 29,83	800	1217	1	55.7	0	11591	2	1	U 50	LH
MAY 24,83	APR 26,83	1217	1045	1	121.0	0	11620	2	1	62	A
JUN 21,83	MAY 24,83	1045	815	1	72.0	0	11650	2	1	76	
JUL 19,83	JUN 21,83	815	1030	1	22.0	0	11675	2	1	30	N
AUG 16,83	JUL 19,83	1030	830	1	58.0	0	11698	2	1	91	
SEP 13,83	AUG 16,83	830	830	1	99.0	0	11701	2	1	33	N
OCT 11,83	SEP 13,83	830	1547	1	119.0	0	11714	2	1	78	N HM
NOV 8,83	OCT 11,83	1547	815	1	48.2	9	11728	2	1	U 3	F
DEC 6,83	NOV 8,83	815	800	4	60.0	9	11742	2	1	62	HM
JAN 3,84	DEC 6,83	800	815	2	135.0	0	11757	2	1	U 24	G

REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
FEB 1,83	JAN 4,83	U 565.0	21.8	4.51	0.0694	1.15	D 0.35	0.07
MAR 1,83	FEB 1,83	687.0	51.0	4.03	0.1298	3.35	D 0.92	0.14
MAR 29,83	MAR 1,83	1227.0	28.3	4.40	0.0640	3.15	0.47	0.20
APR 26,83	MAR 29,83	917.0	39.9	4.14	0.1014	3.55	0.40	0.21
MAY 24,83	APR 26,83	2449.0	35.7	4.19	0.0898	3.55	0.35	0.13
JUN 21,83	MAY 24,83	1795.0	54.2	4.03	0.1290	6.25	0.42	0.21
JUL 19,83	JUN 21,83	220.0	*****	*****	*****	4.75	0.46	*****
AUG 16,83	JUL 19,83	1724.0	*****	U 7.70	U 8.7600	*****	*****	U 0.52
SEP 13,83	AUG 16,83	1080.0	20.9	G 4.53	0.0484	2.65	0.27	0.27
OCT 11,83	SEP 13,83	3050.0	*****	G 4.53	0.0578	2.20	0.26	0.11
NOV 8,83	OCT 11,83	50.0	*****	3.86	*****	*****	*****	*****
DEC 6,83	NOV 8,83	1220.0	33.0	4.37	0.0808	4.05	0.55	0.41
JAN 3,84	DEC 6,83	1068.0	23.6	4.36	0.0662	1.60	0.54	0.13

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : LIVELY/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIUM MG/L	POTASSIUM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR. MG/L
FEB 1,83	JAN 4,83	0.71	0.31	<W 0.005	0.015	0.350	0.276	0.004
MAR 1,83	FEB 1,83	1.08	0.54	0.020	0.015	0.825	0.530	0.004
MAR 29,83	MAR 1,83	0.31	0.76	D 0.020	0.030	0.220	0.620	0.021
APR 26,83	MAR 29,83	0.07	0.29	0.030	0.040	0.105	0.276	0.007
MAY 24,83	APR 26,83	0.07	0.52	0.030	0.025	0.015	0.370	0.012
JUN 21,83	MAY 24,83	0.11	D 0.72	0.040	0.020	0.015	0.630	0.012
JUL 19,83	JUN 21,83	0.24	1.09	*****	*****	*****	0.960	0.021
AUG 16,83	JUL 19,83	*****	G 32.50	G 0.440	G 8.870	G 2.720	B *****	G 3.350
SEP 13,83	AUG 16,83	0.06	0.39	0.030	0.045	0.070	0.354	0.009
OCT 11,83	SEP 13,83	0.14	0.23	0.015	0.020	0.020	0.222	<T 0.001
NOV 8,83	OCT 11,83	*****	*****	*****	*****	*****	*****	*****
DEC 6,83	NOV 8,83	0.39	0.40	0.085	0.060	0.270	0.312	0.028
JAN 3,84	DEC 6,83	0.45	0.13	0.035	0.020	0.325	0.088	0.013

REMOVAL DATE	EXPOSURE DATE	MANGANESE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
FEB 1,83	JAN 4,83	0.001	0.002	0.006	0.118	0.008	< 0.002	0.055
MAR 1,83	FEB 1,83	0.002	0.007	0.012	0.159	0.017	< 0.002	0.062
MAR 29,83	MAR 1,83	0.003	< 0.001	0.006	0.271	0.008	< 0.002	0.142
APR 26,83	MAR 29,83	0.002	G 0.015	0.008	D 0.152	0.012	< 0.002	0.079
MAY 24,83	APR 26,83	0.002	0.007	0.007	0.049	0.007	< 0.002	0.031
JUN 21,83	MAY 24,83	0.003	0.009	0.007	0.049	0.007	< 0.002	0.014
JUL 19,83	JUN 21,83	0.008	< 0.001	< 0.011	0.040	0.008	< 0.002	0.038
AUG 16,83	JUL 19,83	0.005	0.003	G 0.057	0.118	0.003	< 0.002	0.057
SEP 13,83	AUG 16,83	0.003	< 0.001	0.005	0.040	0.008	< 0.002	0.039
OCT 11,83	SEP 13,83	0.002	0.009	0.004	0.110	0.008	< 0.002	0.075
NOV 8,83	OCT 11,83	*****	*****	*****	*****	*****	*****	*****
DEC 6,83	NOV 8,83	G 0.017	G 0.082	0.014	G 2.952	0.018	0.003	G 1.130
JAN 3,84	DEC 6,83	0.001	G 0.037	0.008	0.357	0.024	< 0.002	0.123

ONTARIO MINISTRY OF THE ENVIRONMENT
 CUMULATIVE SAMPLING ANALYSIS RESULTS
 APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : LIVELY/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
FEB 1,83	JAN 4,83	0.002	0.0001	0.0666	0.0309
MAR 1,83	FEB 1,83	0.006	0.0007	0.1270	0.0933
MAR 29,83	MAR 1,83	0.005	0.0002	0.0634	0.0398
APR 26,83	MAR 29,83	0.015	0.0006	0.1000	0.0724
MAY 24,83	APR 26,83	D 0.020	0.0003	0.0887	0.0646
JUN 21,83	MAY 24,83	0.009	0.0002	0.1290	0.0933
JUL 19,83	JUN 21,83	< 0.006	0.0005	*****	*****
AUG 16,83	JUL 19,83	0.005	< 0.0001	8.6600	G 0.0000
SEP 13,83	AUG 16,83	0.002	0.0001	0.0472	G 0.0295
OCT 11,83	SEP 13,83	0.008	0.0003	0.0542	G 0.0295
NOV 8,83	OCT 11,83	*****	*****	*****	0.1380
DEC 6,83	NOV 8,83	0.045	0.0007	0.0791	0.0427
JAN 3,84	DEC 6,83	G 0.055	0.0012	0.0653	0.0437

PART V

1983 SARNIA

CUMULATIVE PRECIPITATION CHEMISTRY LISTINGS

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : GERMAIN PARK/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
FEB 1,83	JAN 4,83	935	945	3	20.8	0	90003	3	1	***	CD
MAR 1,83	FEB 1,83	950	945	3	25.0	0	90006	3	1	85	CD H
MAR 29,83	MAR 1,83	1030	930	3	39.3	0	90007	3	1	U 7	CDG
APR 26,83	MAR 29,83	935	930	3	65.1	0	90009	3	1	77	C
MAY 24,83	APR 26,83	935	1005	1	105.0	0	90012	3	1	U 33	ACDH
JUN 21,83	MAY 24,83	1005	1010	1	56.5	0	90014	3	1	48	CD NH
JUL 19,83	JUN 21,83	1010	945	1	45.0	0	90015	3	1	30	N
AUG 16,83	JUL 19,83	1000	1005	1	88.5	0	90017	3	1	52	ABCD H
SEP 13,83	AUG 16,83	1010	930	1	34.0	0	90019	3	1	23	C N
OCT 11,83	SEP 13,83	935	1045	1	57.0	0	90020	2	1	23	CD NHM
NOV 8,83	OCT 11,83	1045	1005	1	67.5	0	90021	2	1	U 58	ACH HC
DEC 6,83	NOV 8,83	1010	930	3	119.5	0	90023	3	1	77	C HM
JAN 3,84	DEC 6,83	940	915	2	49.7	0	90024	3	1	48	C N

REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
FEB 1,83	JAN 4,83	*****	*****	*****	*****	*****	*****	*****
MAR 1,83	FEB 1,83	696.0	57.0	4.21	0.0926	7.95	1.42	2.50
MAR 29,83	MAR 1,83	U 99.0	103.0	*****	*****	15.60	2.96	*****
APR 26,83	MAR 29,83	1636.0	36.8	7.27	0.0160	5.40	0.84	4.45
MAY 24,83	APR 26,83	1137.0	34.3	7.00	0.0174	7.45	0.70	3.10
JUN 21,83	MAY 24,83	883.0	52.1	7.22	0.0204	12.50	1.24	4.55
JUL 19,83	JUN 21,83	440.0	56.0	7.10	0.0256	13.30	1.46	4.99
AUG 16,83	JUL 19,83	1507.0	52.0	6.94	0.0216	12.40	1.23	4.35
SEP 13,83	AUG 16,83	257.0	89.0	7.63	0.0336	G 25.30	1.75	9.00
OCT 11,83	SEP 13,83	432.0	31.2	7.70	0.0198	7.90	0.68	3.40
NOV 8,83	OCT 11,83	1291.0	31.5	5.22	0.0270	6.50	0.54	1.96
DEC 6,83	NOV 8,83	2997.0	16.7	7.03	0.0170	3.90	0.46	1.71
JAN 3,84	DEC 6,83	786.0	16.6	6.76	0.0176	2.85	0.52	1.53

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : GERMAIN PARK/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
FEB 1,83	JAN 4,83	*****	*****	*****	*****	*****	*****	*****
MAR 1,83	FEB 1,83	1.46	1.46	0.445	0.055	0.780	1.160	0.013
MAR 29,83	MAR 1,83	3.14	1.44	*****	*****	*****	0.840	0.027
APR 26,83	MAR 29,83	0.70	0.43	0.720	0.065	0.240	0.386	0.008
MAY 24,83	APR 26,83	0.37	0.82	0.695	0.065	0.170	0.710	0.017
JUN 21,83	MAY 24,83	0.49	1.23	1.100	0.100	0.175	1.030	0.014
JUL 19,83	JUN 21,83	0.54	1.71	1.080	0.095	0.140	1.410	0.019
AUG 16,83	JUL 19,83	0.64	1.21	1.000	0.110	0.120	1.130	<T 0.004
SEP 13,83	AUG 16,83	1.02	0.85	1.750	0.230	0.260	> 2.000	0.034
OCT 11,83	SEP 13,83	0.36	3.35	0.750	0.075	<W 0.005	0.550	0.083
NOV 8,83	OCT 11,83	0.38	0.59	0.470	0.060	0.100	0.470	0.018
DEC 6,83	NOV 8,83	0.35	0.43	0.415	0.025	0.075	0.330	0.006
JAN 3,84	DEC 6,83	1.10	0.91	0.380	0.035	0.575	0.230	0.031

REMOVAL DATE	EXPOSURE DATE	MANGANSE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
FEB 1,83	JAN 4,83	*****	*****	*****	*****	*****	*****	*****
MAR 1,83	FEB 1,83	0.010	0.004	0.039	0.189	0.042	0.007	0.122
MAR 29,83	MAR 1,83	*****	*****	*****	*****	*****	*****	*****
APR 26,83	MAR 29,83	0.010	0.001	0.022	0.128	0.018	< 0.002	0.138
MAY 24,83	APR 26,83	0.012	0.002	0.030	0.416	0.039	0.002	0.310
JUN 21,83	MAY 24,83	0.011	0.002	0.027	0.288	0.034	0.006	0.210
JUL 19,83	JUN 21,83	0.016	< 0.001	0.025	0.501	0.060	0.004	0.563
AUG 16,83	JUL 19,83	0.011	< 0.001	0.028	0.168	0.032	0.002	0.178
SEP 13,83	AUG 16,83	*****	*****	*****	*****	*****	*****	*****
OCT 11,83	SEP 13,83	*****	*****	*****	*****	*****	*****	*****
NOV 8,83	OCT 11,83	0.006	< 0.001	L 0.028	L 0.072	L 0.014	0.008	L 0.085
DEC 6,83	NOV 8,83	0.005	0.001	0.018	0.082	0.013	0.005	0.078
JAN 3,84	DEC 6,83	0.008	0.003	0.026	0.218	0.028	0.007	0.165

ONTARIO MINISTRY OF THE ENVIRONMENT
 CUMULATIVE SAMPLING ANALYSIS RESULTS
 APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : GERMAIN PARK/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
FEB 1,83	JAN 4,83	*****	*****	*****	*****
MAR 1,83	FEB 1,83	0.016	0.0005	0.0902	0.0617
MAR 29,83	MAR 1,83	*****	*****	*****	*****
APR 26,83	MAR 29,83	0.009	< 0.0001	0.0123	0.0001
MAY 24,83	APR 26,83	0.029	0.0003	0.0141	0.0001
JUN 21,83	MAY 24,83	0.013	0.0002	0.0176	0.0001
JUL 19,83	JUN 21,83	0.011	0.0001	0.0212	0.0001
AUG 16,83	JUL 19,83	0.005	0.0002	0.0190	0.0001
SEP 13,83	AUG 16,83	*****	*****	0.0234	0.0000
OCT 11,83	SEP 13,83	*****	*****	0.0173	0.0000
NOV 8,83	OCT 11,83	L 0.012	0.0002	0.0261	0.0060
DEC 6,83	NOV 8,83	0.006	< 0.0001	0.0166	0.0001
JAN 3,84	DEC 6,83	0.024	0.0002	0.0169	0.0002

PART VI

1983 TORONTO REGION

CUMULATIVE PRECIPITATION CHEMISTRY LISTINGS

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : TORONTO/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	SAMPLING END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
FEB 1,83	JAN 4,83	830	830	3	26.0	0	40003	3	1	97	H
MAR 1,83	FEB 1,83	830	800	3	41.0	0	40012	3	1	74	
MAR 29,83	MAR 1,83	800	820	3	67.0	0	40024	3	1	65	AB
APR 26,83	MAR 29,83	830	830	1	70.0	0	40039	2	1	58	A
MAY 24,83	APR 26,83	830	830	1	102.0	0	40058	2	1	75	H
JUN 21,83	MAY 24,83	830	830	1	33.0	0	40071	2	1	88	AC
JUL 19,83	JUN 21,83	830	830	1	18.0	0	40082	2	1	0	F
AUG 16,83	JUL 19,83	900	900	1	48.0	0	38285	2	1	65	
SEP 13,83	AUG 16,83	900	900	1	64.0	0	38288	2	1	70	
OCT 11,83	SEP 13,83	900	900	1	58.0	0	38291	2	1	82	DC HCM
NOV 8,83	OCT 11,83	900	830	3	83.4	9	40089	2	1	82	ABC HM
DEC 6,83	NOV 8,83	830	1320	3	46.0	0	40108	2	1	159	N
JAN 3,84	DEC 6,83	1320	900	3	81.8	9	40115	2	1	81	HM

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REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
FEB 1,83	JAN 4,83	821.0	64.0	4.98	0.0496	8.75	1.27	4.00
MAR 1,83	FEB 1,83	993.0	47.5	*****	*****	6.55	1.14	2.60
MAR 29,83	MAR 1,83	1417.0	41.1	*****	*****	5.45	0.73	2.90
APR 26,83	MAR 29,83	1327.0	41.4	6.65	0.0228	8.90	1.15	3.90
MAY 24,83	APR 26,83	2499.0	30.4	4.83	0.1068	5.95	0.60	1.72
JUN 21,83	MAY 24,83	944.0	41.1	4.27	0.1002	5.95	0.70	0.90
JUL 19,83	JUN 21,83	0.0	*****	*****	*****	*****	*****	*****
AUG 16,83	JUL 19,83	1015.0	38.0	G 7.26	0.0186	8.45	0.83	G 3.71
SEP 13,83	AUG 16,83	1464.0	29.5	4.70	0.0462	4.85	0.49	1.06
OCT 11,83	SEP 13,83	1546.0	53.4	4.29	0.0594	6.15	0.76	0.99
NOV 8,83	OCT 11,83	2245.0	15.5	U 5.49	0.0520	4.05	0.52	1.00
DEC 6,83	NOV 8,83	2375.0	24.7	4.60	0.0510	3.50	0.57	0.99
JAN 3,84	DEC 6,83	2153.0	23.3	5.89	0.0212	3.25	0.55	1.34

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : TORONTO/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
FEB 1,83	JAN 4,83	7.30	1.25	0.700	0.090	4.550	0.930	0.020
MAR 1,83	FEB 1,83	3.45	0.63	0.480	0.040	2.000	0.560	0.017
MAR 29,83	MAR 1,83	3.02	1.45	0.550	0.130	2.000	0.710	G 0.119
APR 26,83	MAR 29,83	0.83	0.97	0.790	0.100	0.285	0.700	0.032
MAY 24,83	APR 26,83	0.44	0.82	0.335	0.060	0.115	0.720	0.016
JUN 21,83	MAY 24,83	0.39	0.92	0.205	0.050	0.055	0.760	0.012
JUL 19,83	JUN 21,83	*****	*****	*****	*****	*****	*****	*****
AUG 16,83	JUL 19,83	0.54	0.91	0.750	0.105	0.210	0.750	0.028
SEP 13,83	AUG 16,83	0.23	0.71	0.230	0.050	0.065	0.670	0.021
OCT 11,83	SEP 13,83	0.32	0.65	0.180	0.040	0.050	0.590	0.019
NOV 8,83	OCT 11,83	0.36	0.33	0.205	0.060	0.160	0.336	0.012
DEC 6,83	NOV 8,83	0.62	0.36	0.175	0.040	0.325	0.306	0.010
JAN 3,84	DEC 6,83	2.28	0.29	0.010	0.040	1.330	0.216	0.015

REMOVAL DATE	EXPOSURE DATE	MANGANSE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
FEB 1,83	JAN 4,83	0.022	0.003	0.066	0.523	0.113	0.003	0.281
MAR 1,83	FEB 1,83	0.013	< 0.001	0.044	0.467	0.084	< 0.002	0.173
MAR 29,83	MAR 1,83	0.015	< 0.001	0.047	L 0.136	0.065	< 0.002	0.214
APR 26,83	MAR 29,83	0.020	0.002	0.039	0.404	0.071	< 0.002	0.234
MAY 24,83	APR 26,83	0.010	0.001	0.027	0.181	0.038	< 0.002	0.126
JUN 21,83	MAY 24,83	0.008	0.001	0.021	0.118	0.035	< 0.002	0.090
JUL 19,83	JUN 21,83	*****	*****	*****	*****	*****	*****	*****
AUG 16,83	JUL 19,83	0.017	< 0.001	0.028	0.170	0.042	< 0.002	0.142
SEP 13,83	AUG 16,83	0.006	< 0.001	0.013	0.091	0.022	< 0.002	0.064
OCT 11,83	SEP 13,83	0.008	< 0.001	0.016	0.078	0.026	< 0.002	0.068
NOV 8,83	OCT 11,83	0.005	< 0.001	0.018	0.066	0.024	< 0.002	0.053
DEC 6,83	NOV 8,83	0.005	< 0.001	0.023	0.098	0.024	< 0.002	0.068
JAN 3,84	DEC 6,83	0.006	0.001	G 0.308	0.114	0.039	< 0.002	0.093

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : TORONTO/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
FEB 1,83	JAN 4,83	0.023	0.0008	0.0426	0.0105
MAR 1,83	FEB 1,83	0.012	0.0004	*****	*****
MAR 29,83	MAR 1,83	0.010	0.0004	*****	*****
APR 26,83	MAR 29,83	0.009	0.0004	0.0187	0.0002
MAY 24,83	APR 26,83	0.007	0.0002	0.1000	0.0148
JUN 21,83	MAY 24,83	0.006	0.0002	0.0987	0.0537
JUL 19,83	JUN 21,83	*****	*****	*****	*****
AUG 16,83	JUL 19,83	0.019	0.0002	0.0161	G 0.0001
SEP 13,83	AUG 16,83	0.001	0.0001	0.0451	0.0200
OCT 11,83	SEP 13,83	0.003	0.0001	0.0579	0.0513
NOV 8,83	OCT 11,83	0.003	0.0003	0.0522	U 0.0032
DEC 6,83	NOV 8,83	0.012	0.0002	0.0498	0.0251
JAN 3,84	DEC 6,83	0.008	0.0005	0.0224	0.0013

PART VII

1984 HALDIMOND-NORFOLK (NEMP)

CUMULATIVE PRECIPITATION CHEMISTRY LISTINGS

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : DOG'S NEST EAST/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
JAN 31,84	JAN 3,84	1130	1150	3	14.0	0	39367	3	1	109	C
FEB 29,84	JAN 31,84	1150	1450	3	85.6	9	39369	3	1	51	CD
MAR 27,84	FEB 27,84	1450	1145	3	117.0	0	39371	3	1	15	C
JUN 19,84	MAY 29,84	1340	1215	1	87.0	1	39376	3	1	86	ACDG
JUL 17,84	JUN 19,84	1215	1330	1	70.0	0	39379	3	1	64	ACD
AUG 14,84	JUL 17,84	1330	1445	1	141.0	0	39382	3	1	81	ACD
SEP 11,84	AUG 14,84	1445	1350	1	111.0	0	39384	3	1	65	CD
OCT 9,84	SEP 11,84	1350	1235	1	54.0	1	39385	3	1	80	AC
NOV 6,84	OCT 9,84	1235	1330	1	57.0	1	39387	3	1	63	
DEC 4,84	NOV 6,84	1330	1300	3	71.0	1	39389	3	1	51	CD
JAN 2,85	DEC 4,84	1300	1300	2	113.0	1	39391	3	1	68	DFGJ

REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
JAN 31,84	JAN 3,84	497.0	42.3	4.13	0.1068	4.00	0.94	1.10
FEB 29,84	JAN 31,84	1444.0	27.0	4.36	0.0720	2.15	0.61	0.39
MAR 27,84	FEB 29,84	571.0	35.5	G 4.76	0.0612	5.75	1.08	G 2.35
JUN 19,84	MAY 29,84	2441.0	48.4	4.13	0.1048	5.50	0.70	0.58
JUL 17,84	JUN 19,84	1459.0	60.5	4.10	0.1200	8.15	0.81	0.51
AUG 14,84	JUL 17,84	3730.0	32.0	4.35	0.0694	3.75	0.49	0.31
SEP 11,84	AUG 14,84	2367.0	51.0	4.06	0.1194	5.20	0.56	0.20
OCT 9,84	SEP 11,84	1404.0	39.1	4.34	0.0782	5.20	0.71	0.73
NOV 6,84	OCT 9,84	1175.0	36.0	4.16	0.0916	3.65	0.47	0.27
DEC 4,84	NOV 6,84	1179.0	39.6	4.25	0.0882	3.90	0.81	0.41
JAN 2,85	DEC 4,84	2514.0	25.5	4.52	*****	2.80	0.44	0.14

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : DOG'S NEST EAST/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
JAN 31,84	JAN 3,84	G 0.76	0.37	0.155	0.020	G 0.385	0.284	0.033
FEB 29,84	JAN 31,84	0.24	0.33	0.070	0.030	0.145	0.232	0.015
MAR 27,84	FEB 29,84	0.66	0.69	G 0.450	0.045	G 0.300	0.380	G 0.065
JUN 19,84	MAY 29,84	0.31	0.81	0.115	0.170	G 0.215	0.655	0.014
JUL 17,84	JUN 19,84	0.30	G 1.78	0.120	G 0.270	0.120	G 1.600	G 0.078
AUG 14,84	JUL 17,84	0.16	0.70	0.060	0.055	0.040	0.590	0.010
SEP 11,84	AUG 14,84	0.22	0.67	0.040	0.040	0.100	0.595	0.013
OCT 9,84	SEP 11,84	0.33	1.03	0.115	0.110	0.175	0.940	0.019
NOV 6,84	OCT 9,84	0.21	0.54	0.040	0.020	0.040	0.510	0.005
DEC 4,84	NOV 6,84	0.31	1.04	0.070	0.030	0.090	0.940	0.008
JAN 2,85	DEC 4,84	G 0.75	0.79	0.045	0.085	G 0.375	0.685	0.008

REMOVAL DATE	EXPOSURE DATE	MANGANSE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
JAN 31,84	JAN 3,84	0.020	0.002	0.015	0.227	0.013	0.002	0.270
FEB 29,84	JAN 31,84	0.009	< 0.001	0.008	0.084	0.006	< 0.002	0.071
MAR 27,84	FEB 29,84	0.037	0.002	0.028	G 0.439	0.010	< 0.002	G 0.539
JUN 19,84	MAY 29,84	0.005	< 0.001	0.008	0.012	0.005	< 0.002	0.028
JUL 17,84	JUN 19,84	0.006	< 0.001	0.015	0.057	0.011	< 0.002	0.053
AUG 14,84	JUL 17,84	0.003	< 0.001	0.007	0.034	0.007	< 0.002	0.028
SEP 11,84	AUG 14,84	0.003	< 0.001	0.006	0.036	0.007	< 0.002	0.035
OCT 9,84	SEP 11,84	0.006	0.001	0.010	0.047	0.008	< 0.000	0.051
NOV 6,84	OCT 9,84	0.003	0.001	0.006	0.023	0.010	0.001	0.019
DEC 4,84	NOV 6,84	0.007	0.000	0.016	0.038	0.007	0.001	0.028
JAN 2,85	DEC 4,84	0.002	0.001	0.013	0.023	0.007	< 0.000	0.050

ONTARIO MINISTRY OF THE ENVIRONMENT
 CUMULATIVE SAMPLING ANALYSIS RESULTS
 APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : DOG'S NEST EAST/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
JAN 31,84	JAN 3,84	0.004	0.0001	0.1060	0.0741
FEB 29,84	JAN 31,84	< 0.002	0.0001	0.0727	0.0437
MAR 27,84	FEB 29,84	0.002	0.0003	0.0589	G 0.0174
JUN 19,84	MAY 29,84	< 0.001	0.0001	0.1020	0.0741
JUL 17,84	JUN 19,84	0.003	0.0001	0.1150	0.0794
AUG 14,84	JUL 17,84	0.001	0.0001	0.0685	0.0447
SEP 11,84	AUG 14,84	0.001	0.0002	0.1190	0.0871
OCT 9,84	SEP 11,84	0.001	0.0002	0.0759	0.0457
NOV 6,84	OCT 9,84	0.001	0.0001	0.0904	0.0692
DEC 4,84	NOV 6,84	0.001	0.0001	0.0872	0.0562
JAN 2,85	DEC 4,84	RRV 0.004	0.0004	0.0548	0.0302

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : NORTH DUFFERIN/CUMULATIVE PRECIP.

PAGE : 1

REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
JAN 31,84	JAN 3,84	1005	930	3	22.0	0	39368	3	1	78	D
FEB 29,84	JAN 31,84	930	1250	3	96.6	9	39370	3	1	49	D
MAR 27,84	FEB 29,84	1250	915	3	130.0	0	39372	3	1	21	C N
APR 24,84	MAR 27,84	915	930	3	79.0	0	39373	3	1	64	ACDG
MAY 22,84	APR 24,84	940	1015	1	83.0	0	39374	3	1	77	ACD C
JUN 19,84	MAY 22,84	1015	1030	1	86.0	0	39377	3	1	81	ACD
JUL 17,84	JUN 19,84	1030	940	1	54.0	0	39378	3	1	75	ACD
AUG 14,84	JUL 17,84	940	1015	1	55.0	0	39381	3	1	76	ACD
SEP 11,84	AUG 14,84	1015	940	1	95.0	0	39383	3	1	78	ACD
OCT 9,84	SEP 11,84	940	1030	1	50.0	1	39386	3	1	78	ACD
NOV 6,84	OCT 9,84	1030	1020	1	41.0	1	39388	3	1	73	CD
DEC 4,84	NOV 6,84	1020	930	3	15.8	1	39390	3	1	204	CD N
JAN 2,85	DEC 4,84	930	945	2	106.0	1	39393	3	1	72	FDJ

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REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
JAN 31,84	JAN 3,84	562.0	40.0	4.16	0.1062	2.95	0.92	0.41
FEB 29,84	JAN 31,84	1544.0	24.1	4.44	0.0628	2.30	0.53	0.42
MAR 27,84	FEB 29,84	912.0	30.0	4.42	0.0750	3.75	0.60	0.86
APR 24,84	MAR 27,84	1642.0	42.5	4.18	0.0912	4.45	0.85	0.70
MAY 22,84	APR 24,84	2088.0	25.1	4.79	0.0482	3.45	0.55	1.09
JUN 19,84	MAY 22,84	2272.0	48.4	4.07	0.1164	4.95	0.53	0.41
JUL 17,84	JUN 19,84	1318.0	54.1	4.03	0.1248	5.75	0.60	0.31
AUG 14,84	JUL 17,84	1361.0	40.6	4.23	0.0886	4.90	0.68	0.68
SEP 11,84	AUG 14,84	2413.0	42.3	4.16	0.0988	4.65	0.53	0.48
OCT 9,84	SEP 11,84	1280.0	60.5	3.99	0.1388	6.40	0.75	0.72
NOV 6,84	OCT 9,84	981.0	47.0	4.05	0.1158	4.05	0.55	0.29
DEC 4,84	NOV 6,84	1047.0	46.6	4.09	0.1148	4.25	0.69	0.49
JAN 2,85	DEC 4,84	2501.0	23.0	4.40	*****	2.25	0.34	0.10

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : NORTH DUFFERIN/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
JAN 31,84	JAN 3,84	G 0.75	0.49	0.075	<T 0.010	G 0.310	0.430	0.020
FEB 29,84	JAN 31,84	0.32	0.33	0.095	0.020	0.145	0.268	0.012
MAR 27,84	FEB 29,84	0.40	0.48	0.190	0.030	0.120	0.334	0.025
APR 24,84	MAR 27,84	0.25	0.85	0.120	0.030	0.055	0.700	0.006
MAY 22,84	APR 24,84	0.15	0.39	0.260	0.025	0.080	0.280	0.019
JUN 19,84	MAY 22,84	0.18	0.51	0.090	0.035	0.030	0.375	0.008
JUL 17,84	JUN 19,84	0.17	0.58	0.080	0.030	0.020	0.550	0.005
AUG 14,84	JUL 17,84	0.17	0.64	0.190	0.040	0.080	0.565	0.006
SEP 11,84	AUG 14,84	0.21	0.42	0.130	0.030	0.075	0.395	0.028
OCT 9,84	SEP 11,84	G 0.63	0.62	0.115	0.030	0.125	0.590	0.007
NOV 6,84	OCT 9,84	G 0.48	0.42	0.050	<T 0.010	0.035	0.380	<T 0.004
DEC 4,84	NOV 6,84	0.51	0.70	0.095	0.040	0.085	0.535	0.007
JAN 2,85	DEC 4,84	0.27	0.43	0.045	0.025	0.090	0.330	0.006

REMOVAL DATE	EXPOSURE DATE	MANGANSE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
JAN 31,84	JAN 3,84	0.004	< 0.001	0.010	0.096	0.009	< 0.002	0.107
FEB 29,84	JAN 31,84	0.005	< 0.001	0.007	0.079	0.005	< 0.002	0.077
MAR 27,84	FEB 29,84	0.008	< 0.001	0.009	0.139	0.008	< 0.002	0.144
APR 24,84	MAR 27,84	0.005	< 0.001	0.009	0.057	0.012	< 0.002	0.049
MAY 22,84	APR 24,84	G 0.029	< 0.001	0.009	G 0.354	0.008	< 0.002	G 0.449
JUN 19,84	MAY 22,84	0.004	< 0.001	0.005	0.045	0.005	< 0.002	0.044
JUL 17,84	JUN 19,84	0.004	< 0.001	0.007	0.047	0.010	< 0.002	0.035
AUG 14,84	JUL 17,84	0.005	< 0.001	0.009	0.073	0.008	< 0.002	0.054
SEP 11,84	AUG 14,84	0.004	< 0.001	0.005	0.047	0.004	< 0.002	0.040
OCT 9,84	SEP 11,84	0.008	0.001	0.009	0.107	0.007	0.001	0.132
NOV 6,84	OCT 9,84	0.002	0.000	0.009	0.023	0.012	0.001	0.023
DEC 4,84	NOV 6,84	0.004	0.000	0.015	0.030	0.010	0.001	0.032
JAN 2,85	DEC 4,84	0.002	0.000	0.005	0.023	0.005	< 0.000	0.027

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : NORTH DUFFERIN/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
JAN 31,84	JAN 3,84	< 0.003	0.0001	0.1050	0.0692
FEB 29,84	JAN 31,84	< 0.002	0.0002	0.0630	0.0363
MAR 27,84	FEB 29,84	< 0.002	0.0002	0.0745	0.0380
APR 24,84	MAR 27,84	0.001	0.0001	0.0913	0.0661
MAY 22,84	APR 24,84	0.001	0.0001	0.0471	G 0.0162
JUN 19,84	MAY 22,84	0.001	0.0004	0.1160	0.0851
JUL 17,84	JUN 19,84	< 0.002	0.0001	0.1230	0.0933
AUG 14,84	JUL 17,84	0.001	0.0001	0.0878	0.0589
SEP 11,84	AUG 14,84	0.001	0.0001	0.0989	0.0692
OCT 9,84	SEP 11,84	0.001	0.0002	0.1380	0.1023
NOV 6,84	OCT 9,84	0.001	0.0001	0.1150	0.0891
DEC 4,84	NOV 6,84	0.001	0.0001	0.1140	0.0813
JAN 2,85	DEC 4,84	0.001	0.0001	0.0603	0.0398

PART VIII

1984 SUDBURY REGION

CUMULATIVE PRECIPITATION CHEMISTRY LISTINGS

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : BURWASH/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
JAN 31,84	JAN 3,84	1130	1000	2	34.0	0	11770	2	1	U 51	F
FEB 28,84	JAN 31,84	1200	1200	*	37.8	0	11802	2	1	U 0	FE
MAR 27,84	FEB 28,84	1000	1045	3	21.5	0	11803	2	1	U 212	J
APR 24,84	MAR 27,84	1045	1300	1	42.4	0	11825	2	1	U 25	CFI
MAY 29,84	APR 24,84	1300	1345	1	62.6	0	11834	2	1	U 4	CDFI
JUN 19,84	MAY 29,84	1345	1010	1	95.1	0	11848	2	1	U 50	ACI
JUL 17,84	JUN 19,84	1010	1100	1	57.0	0	11856	2	1	237	CD N
AUG 15,84	JUL 17,84	1100	916	1	67.0	0	11879	2	1	86	CD
SEP 11,84	AUG 15,84	916	1030	1	122.0	0	35210	2	1	84	D
OCT 9,84	SEP 11,84	1030	1044	1	81.0	0	35236	2	1	U 21	CG
NOV 6,84	OCT 9,84	1044	1348	1	112.0	0	35256	2	1	78	C
DEC 4,84	NOV 6,84	1348	1110	3	31.7	2	35275	2	1	37	N
JAN 4,85	DEC 4,84	1110	1018	2	76.0	2	35316	2	1	75	

REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
JAN 31,84	JAN 3,84	568.0	49.5	4.12	0.1070	1.85	1.28	*****
FEB 28,84	JAN 31,84	0.0	*****	*****	*****	*****	*****	*****
MAR 27,84	FEB 28,84	1484.0	G 82.0	3.87	G 0.1932	6.05	G 1.62	0.41
APR 24,84	MAR 27,84	354.0	21.6	4.39	0.0696	2.00	0.15	0.09
MAY 29,84	APR 24,84	100.0	> 100.0	G 7.60	0.0764	G 20.30	G 0.84	G 4.84
JUN 19,84	MAY 29,84	1573.0	40.3	4.13	0.0950	5.30	0.58	0.58
JUL 17,84	JUN 19,84	4390.0	6.6	G 4.93	0.0288	0.90	0.08	0.03
AUG 15,84	JUL 17,84	1871.0	38.5	4.12	0.0924	4.00	0.38	0.20
SEP 11,84	AUG 15,84	3329.0	27.3	4.26	0.0752	2.90	0.25	0.08
OCT 9,84	SEP 11,84	563.0	29.3	4.32	0.0752	2.85	0.48	0.22
NOV 6,84	OCT 9,84	2860.0	30.1	4.24	0.0788	2.65	0.40	0.07
DEC 4,84	NOV 6,84	391.0	38.0	4.21	0.0966	2.55	0.79	0.26
JAN 4,85	DEC 4,84	1871.0	27.8	4.32	0.0734	1.85	0.46	0.10

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : BURWASH/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
JAN 31,84	JAN 3,84	G 3.30	0.41	*****	*****	*****	0.216	0.016
FEB 28,84	JAN 31,84	*****	*****	*****	*****	*****	*****	*****
MAR 27,84	JAN 31,84	G 2.17	0.88	0.070	0.050	G 1.950	0.630	0.017
APR 24,84	MAR 27,84	0.19	*****	0.015	<T 0.010	0.195	<W 0.005	*****
MAY 29,84	APR 24,84	G 1.85	*****	G 0.510	G 3.000	G 1.450	*****	*****
JUN 19,84	MAY 29,84	0.22	1.01	0.115	*****	0.125	0.725	0.027
JUL 17,84	JUN 19,84	0.02	0.12	<W 0.005	<W 0.005	<W 0.005	0.095	<T 0.001
AUG 15,84	JUL 17,84	0.13	0.50	0.035	0.030	0.070	0.350	0.007
SEP 11,84	AUG 15,84	0.08	0.31	0.010	0.020	0.025	0.255	<T 0.002
OCT 9,84	SEP 11,84	0.16	0.45	0.035	0.040	0.075	0.315	<T 0.003
NOV 6,84	OCT 9,84	0.11	0.30	0.015	<T 0.005	0.030	0.270	0.005
DEC 4,84	NOV 6,84	0.41	0.41	0.040	<T 0.010	0.275	0.290	<T 0.004
JAN 4,85	DEC 4,84	0.81	0.22	0.020	<T 0.015	0.580	0.155	0.006

REMOVAL DATE	EXPOSURE DATE	MANGANESE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
JAN 31,84	JAN 3,84	*****	*****	*****	*****	*****	*****	*****
FEB 28,84	JAN 31,84	*****	*****	*****	*****	*****	*****	*****
MAR 27,84	JAN 31,84	0.005	G 0.026	0.017	0.227	0.024	< 0.002	0.117
APR 24,84	MAR 27,84	< 0.001	< 0.001	0.006	0.036	0.011	< 0.002	0.042
MAY 29,84	APR 24,84	*****	*****	*****	*****	*****	*****	*****
JUN 19,84	MAY 29,84	0.008	0.003	0.007	0.087	0.011	< 0.002	0.096
JUL 17,84	JUN 19,84	< 0.001	< 0.001	< 0.002	0.006	0.004	< 0.002	0.008
AUG 15,84	JUL 17,84	0.002	< 0.001	0.004	0.026	0.005	< 0.002	0.018
SEP 11,84	AUG 15,84	0.001	< 0.001	0.001	0.021	0.007	< 0.002	0.025
OCT 9,84	SEP 11,84	0.003	< 0.001	0.008	0.047	0.004	< 0.002	0.055
NOV 6,84	OCT 9,84	< 0.001	< 0.001	0.004	0.009	0.005	< 0.002	0.011
DEC 4,84	NOV 6,84	0.003	0.006	0.021	0.076	0.015	< 0.000	0.047
JAN 4,85	DEC 4,84	0.001	0.003	0.005	0.022	0.008	< 0.000	0.019

ONTARIO MINISTRY OF THE ENVIRONMENT
 CUMULATIVE SAMPLING ANALYSIS RESULTS
 APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : BURWASH/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
JAN 31,84	JAN 3,84	*****	*****	0.1080	0.0759
FEB 28,84	JAN 31,84	*****	*****	*****	*****
MAR 27,84	JAN 31,84	0.053	0.0013	0.1920	0.1349
APR 24,84	MAR 27,84	0.004	0.0003	0.0679	0.0407
MAY 29,84	APR 24,84	*****	*****	0.0236	G 0.0000
JUN 19,84	MAY 29,84	0.006	0.0001	0.0940	0.0741
JUL 17,84	JUN 19,84	0.002	< 0.0001	0.0279	G 0.0117
AUG 15,84	JUL 17,84	< 0.002	0.0001	0.0927	0.0759
SEP 11,84	AUG 15,84	0.001	0.0001	0.0734	0.0550
OCT 9,84	SEP 11,84	0.004	0.0002	0.0755	0.0479
NOV 6,84	OCT 9,84	0.001	0.0001	0.0775	0.0575
DEC 4,84	NOV 6,84	0.017	0.0003	0.0983	0.0617
JAN 4,85	DEC 4,84	0.005	0.0001	0.0720	0.0479

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : HANMER/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	SAMPLING END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
JAN 31,84	JAN 3,84	1420	1100	2	23.1	9	11772	2	1	23	
FEB 28,84	JAN 31,84	1420	1000	3	52.1	9	11790	2	1	U 31	F
MAR 27,84	FEB 28,84	1000	1330	1	18.2	9	11808	2	1	U 0	EF
APR 24,84	MAR 27,84	1330	1200	1	33.4	9	11826	2	1	U 64	FJ
DEC 4,84	NOV 6,84	1130	1420	3	*****	*	35276	2	1	***	
JAN 4,85	DEC 4,84	1356	1400	2	103.0	2	35314	2	1	22	N

REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
JAN 31,84	JAN 3,84	178.0	58.8	4.12	0.1230	2.50	G 1.39	0.28
FEB 28,84	JAN 31,84	532.0	G 85.0	3.78	G 0.2220	6.90	G 1.76	0.55
MAR 27,84	FEB 28,84	0.0	*****	*****	*****	*****	*****	*****
APR 24,84	MAR 27,84	702.0	14.3	G 4.67	0.0470	1.55	0.14	0.14
DEC 4,84	NOV 6,84	1083.0	37.0	4.19	0.0952	2.95	0.63	0.23
JAN 4,85	DEC 4,84	744.0	28.7	4.20	0.1004	2.55	0.58	0.18

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : HANMER/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIUM MG/L	POTASSIUM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
JAN 31,84	JAN 3,84	G 4.60	0.45	0.040	0.040	G 3.880	0.250	0.013
FEB 28,84	JAN 31,84	1.08	0.87	0.075	0.080	1.200	0.690	0.017
MAR 27,84	FEB 28,84	*****	*****	*****	*****	*****	*****	*****
APR 24,84	MAR 27,84	0.20	0.18	0.040	<T 0.015	0.155	0.045	0.018
DEC 4,84	NOV 6,84	0.31	0.35	0.030	0.030	0.165	0.285	<T 0.003
JAN 4,85	DEC 4,84	0.61	0.34	0.030	0.025	0.430	0.140	G 0.055

REMOVAL DATE	EXPOSURE DATE	MANGANESE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
JAN 31,84	JAN 3,84	*****	*****	*****	*****	*****	*****	*****
FEB 28,84	JAN 31,84	0.016	G 0.063	0.068	0.405	0.045	< 0.002	0.152
MAR 27,84	FEB 28,84	*****	*****	*****	*****	*****	*****	*****
APR 24,84	MAR 27,84	0.002	< 0.001	0.019	0.042	0.007	< 0.002	0.053
DEC 4,84	NOV 6,84	0.002	G 0.021	0.023	0.057	0.034	< 0.000	0.036
JAN 4,85	DEC 4,84	0.002	G 0.017	0.013	0.048	0.019	< 0.000	0.069

ONTARIO MINISTRY OF THE ENVIRONMENT
 CUMULATIVE SAMPLING ANALYSIS RESULTS
 APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : HANMER/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
JAN 31,84	JAN 3,84	*****	*****	0.1220	0.0759
FEB 28,84	JAN 31,84	0.074	G 0.0250	0.2210	0.1660
MAR 27,84	FEB 28,84	*****	*****	*****	*****
APR 24,84	MAR 27,84	0.005	0.0002	0.0459	G 0.0214
DEC 4,84	NOV 6,84	0.052	D 0.0014	0.0964	0.0646
JAN 4,85	DEC 4,84	0.033	0.0007	0.0994	0.0631

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : LIVELY/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
JAN 31,84	JAN 3,84	815	940	2	27.4	0	11771	2	1	47	N
FEB 28,84	JAN 31,84	940	815	3	36.4	0	11789	2	1	72	
MAR 27,84	FEB 28,84	815	815	3	25.2	0	11804	2	1	U 67	G
APR 24,84	MAR 27,84	815	1304	1	53.1	0	11827	2	1	64	
MAY 22,84	APR 24,84	1304	1200	1	39.1	9	11841	2	1	U 0	EFIQ
JUN 19,84	MAY 22,84	1304	821	1	140.3	0	11846	2	1	92	CA
JUL 17,84	JUN 19,84	821	1500	1	92.0	0	11859	2	1	79	ACD
AUG 14,84	JUL 17,84	1500	1250	1	20.0	0	11878	2	1	175	C
SEP 11,84	AUG 14,84	1250	1150	1	145.0	0	35211	2	1	85	D
OCT 9,84	SEP 11,84	1150	1128	1	66.0	0	35240	2	1	U 27	ACDG
NOV 6,84	OCT 9,84	1128	1110	1	106.0	0	35255	2	1	79	
DEC 4,84	NOV 6,84	1200	1340	3	29.5	2	35278	2	1	179	N
JAN 4,85	DEC 4,84	1340	1305	2	70.0	2	35315	2	1	73	CD

REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
JAN 31,84	JAN 3,84	421.0	46.9	4.09	0.1206	1.95	1.15	*****
FEB 28,84	JAN 31,84	858.0	55.3	3.97	0.1448	4.25	1.12	0.17
MAR 27,84	FEB 28,84	555.0	51.0	4.11	0.1288	5.60	0.79	0.64
APR 24,84	MAR 27,84	1108.0	31.6	4.21	0.0930	3.40	0.13	0.08
MAY 22,84	APR 24,84	0.0	*****	*****	*****	*****	*****	*****
JUN 19,84	MAY 22,84	4203.0	33.8	4.23	0.0816	4.20	0.44	0.24
JUL 17,84	JUN 19,84	2383.0	48.1	G 7.29	0.0594	4.15	0.39	0.59
AUG 14,84	JUL 17,84	1137.0	42.5	4.07	0.1034	4.65	0.38	0.18
SEP 11,84	AUG 14,84	4037.0	28.4	4.24	0.0816	3.20	0.21	0.13
OCT 9,84	SEP 11,84	579.0	27.5	4.44	0.0696	2.85	0.48	0.27
NOV 6,84	OCT 9,84	2753.0	37.2	4.18	0.0938	3.45	0.36	0.09
DEC 4,84	NOV 6,84	1719.0	32.9	4.28	0.0838	2.50	0.64	0.21
JAN 4,85	DEC 4,84	1675.0	29.6	4.28	0.0848	2.15	0.52	0.14

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : LIVELY/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
JAN 31,84	JAN 3,84	0.91	0.38	*****	*****	*****	0.206	0.015
FEB 28,84	JAN 31,84	0.50	0.83	0.025	0.030	0.335	0.810	0.014
MAR 27,84	FEB 28,84	0.87	0.69	0.105	0.035	0.590	0.490	G 0.054
APR 24,84	MAR 27,84	0.15	0.13	0.015	<T 0.005	0.115	0.010	0.019
MAY 22,84	APR 24,84	*****	*****	*****	*****	*****	*****	*****
JUN 19,84	APR 24,84	0.12	0.75	0.050	0.115	0.095	0.495	0.028
JUL 17,84	JUN 19,84	0.26	G 7.10	0.190	G 1.070	0.120	G 5.700	G 0.550
AUG 14,84	JUL 17,84	0.10	0.55	0.045	0.020	0.025	0.440	<W 0.001
SEP 11,84	AUG 14,84	0.10	0.31	0.015	<T 0.010	0.035	0.240	0.006
OCT 9,84	SEP 11,84	G 0.49	0.70	0.030	0.140	G 0.355	0.435	0.009
NOV 6,84	OCT 9,84	0.12	0.30	0.015	<T 0.010	0.045	0.280	<W 0.001
DEC 4,84	NOV 6,84	0.18	0.36	0.025	<T 0.005	0.050	0.345	<T 0.002
JAN 4,85	DEC 4,84	0.61	0.19	0.025	<T 0.005	0.400	0.140	0.009

REMOVAL DATE	EXPOSURE DATE	MANGANSE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
JAN 31,84	JAN 3,84	0.002	G 0.072	0.013	0.271	0.020	< 0.002	0.114
FEB 28,84	JAN 31,84	0.004	G 0.032	0.010	0.129	0.018	< 0.002	0.062
MAR 27,84	FEB 28,84	0.004	G 0.032	0.010	G 1.300	0.018	< 0.002	G 0.456
APR 24,84	MAR 27,84	0.001	G 0.043	0.004	D 0.231	0.011	< 0.002	0.088
MAY 22,84	APR 24,84	*****	*****	*****	*****	*****	*****	*****
JUN 19,84	APR 24,84	0.006	G 0.030	0.004	0.076	0.007	< 0.002	0.062
JUL 17,84	JUN 19,84	0.008	0.006	0.019	0.168	0.009	< 0.002	0.100
AUG 14,84	JUL 17,84	0.002	0.008	0.006	0.072	0.005	< 0.002	0.038
SEP 11,84	AUG 14,84	0.001	G 0.018	0.004	0.035	0.013	< 0.002	0.030
OCT 9,84	SEP 11,84	0.003	0.006	0.009	0.111	0.012	< 0.002	0.083
NOV 6,84	OCT 9,84	< 0.001	G 0.019	0.004	0.021	0.012	< 0.002	0.015
DEC 4,84	NOV 6,84	0.002	0.010	0.007	0.101	0.010	< 0.000	0.039
JAN 4,85	DEC 4,84	0.002	G 0.032	0.006	0.303	0.014	< 0.000	0.107

ONTARIO MINISTRY OF THE ENVIRONMENT
 CUMULATIVE SAMPLING ANALYSIS RESULTS
 APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : LIVELY/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
JAN 31,84	JAN 3,84	0.121	0.0007	0.1220	0.0813
FEB 28,84	JAN 31,84	0.047	0.0008	0.1440	0.1072
MAR 27,84	FEB 28,84	0.090	0.0003	0.1250	0.0776
APR 24,84	MAR 27,84	D 0.075	0.0007	0.0915	0.0617
MAY 22,84	APR 24,84	*****	*****	*****	*****
JUN 19,84	APR 24,84	0.042	0.0002	0.0810	0.0589
JUL 17,84	JUN 19,84	0.009	0.0009	0.0374	G 0.0001
AUG 14,84	JUL 17,84	0.005	0.0003	0.1010	0.0851
SEP 11,84	AUG 14,84	0.038	0.0004	0.0802	0.0575
OCT 9,84	SEP 11,84	0.013	0.0003	0.0680	0.0363
NOV 6,84	OCT 9,84	0.021	0.0003	0.0940	0.0661
DEC 4,84	NOV 6,84	0.010	0.0002	0.0849	0.0525
JAN 4,85	DEC 4,84	0.036	0.0005	0.0843	0.0525

PART IX

1984 SARNIA

CUMULATIVE PRECIPITATION CHEMISTRY LISTINGS

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : GERMAIN PARK/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
JAN 31,84	JAN 3,84	920	1000	2	11.6	0	90025	3	1	97	C
APR 24,84	MAR 27,84	1000	1000	3	72.6	0	90028	3	1	80	ACD
MAY 22,84	APR 24,84	1015	945	1	34.5	0	90029	3	1	60	AC HM
JUL 17,84	JUN 19,84	950	930	1	87.0	0	90031	2	1	57	AC
AUG 14,84	JUL 17,84	940	915	1	121.0	0	90032	3	1	71	ACD
SEP 11,84	AUG 14,84	945	930	*	146.0	0	90033	3	1	20	AC N
OCT 9,84	SEP 11,84	930	945	*	71.5	0	90034	3	1	78	AC
NOV 6,84	OCT 9,84	950	1005	*	41.5	0	90035	3	1	64	ACD
DEC 4,84	NOV 6,84	1015	1000	*	65.3	0	90036	3	1	102	CD H
JAN 2,85	DEC 4,84	1000	1000	*	88.3	0	90037	3	1	79	CD H

REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
JAN 31,84	JAN 3,84	366.0	56.1	4.91	0.0598	5.25	1.58	2.05
APR 24,84	MAR 27,84	1904.0	45.3	4.29	0.0770	5.15	1.01	1.05
MAY 22,84	APR 24,84	674.0	52.0	7.04	0.0190	7.75	0.95	8.00
JUL 17,84	JUN 19,84	1633.0	44.2	4.31	0.0814	8.15	0.87	*****
AUG 14,84	JUL 17,84	2814.0	58.0	4.04	0.1124	7.90	0.92	1.51
SEP 11,84	AUG 14,84	950.0	50.5	4.19	0.1050	7.40	0.57	1.05
OCT 9,84	SEP 11,84	1828.0	33.1	5.52	0.0312	8.15	0.50	2.20
NOV 6,84	OCT 9,84	870.0	61.0	6.93	0.0418	12.40	1.17	3.70
DEC 4,84	NOV 6,84	2177.0	21.1	6.33	0.0188	4.55	0.41	1.91
JAN 2,85	DEC 4,84	2269.0	20.4	5.64	0.0256	3.45	0.43	1.33

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : GERMAIN PARK/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIUM MG/L	POTASSIUM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
JAN 31,84	JAN 3,84	U 5.15	1.41	0.500	0.060	U 2.680	1.250	0.027
APR 24,84	MAR 27,84	0.33	0.86	0.245	0.050	0.090	0.770	0.011
MAY 22,84	APR 24,84	0.74	1.40	0.850	0.240	0.295	0.690	0.095
JUL 17,84	JUN 19,84	0.29	*****	*****	*****	*****	0.950	*****
AUG 14,84	JUL 17,84	0.31	0.93	0.315	0.050	0.085	0.760	0.020
SEP 11,84	AUG 14,84	0.27	1.06	0.250	0.040	0.055	0.735	0.032
OCT 9,84	SEP 11,84	0.52	0.99	0.525	0.050	0.125	0.860	0.017
NOV 6,84	OCT 9,84	1.05	2.75	0.800	G 1.050	0.235	G 2.250	G 0.420
DEC 4,84	NOV 6,84	0.59	0.53	0.425	<T 0.010	0.110	0.500	0.005
JAN 2,85	DEC 4,84	0.68	0.53	0.305	0.085	0.350	0.510	0.008

REMOVAL DATE	EXPOSURE DATE	MANGANESE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
JAN 31,84	JAN 3,84	0.016	0.008	G 0.180	0.273	0.050	G 0.011	0.356
APR 24,84	MAR 27,84	0.004	< 0.001	0.016	0.050	0.073	0.005	0.057
MAY 22,84	APR 24,84	*****	*****	*****	*****	*****	*****	*****
JUL 17,84	JUN 19,84	0.007	< 0.001	0.018	0.100	0.019	< 0.002	0.103
AUG 14,84	JUL 17,84	0.008	< 0.001	0.041	0.108	0.018	0.002	0.097
SEP 11,84	AUG 14,84	0.007	< 0.001	0.025	0.173	0.021	< 0.002	0.216
OCT 9,84	SEP 11,84	0.008	0.003	0.023	0.101	0.021	G 0.015	0.108
NOV 6,84	OCT 9,84	0.017	0.002	0.054	0.235	0.041	0.005	0.226
DEC 4,84	NOV 6,84	0.006	0.001	0.032	0.121	0.010	0.007	0.078
JAN 2,85	DEC 4,84	0.004	0.001	0.019	0.046	0.015	0.005	0.048

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : GERMAIN PARK/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
JAN 31,84	JAN 3,84	G 0.222	0.0010	0.0600	0.0123
APR 24,84	MAR 27,84	0.012	0.0001	0.0739	0.0513
MAY 22,84	APR 24,84	*****	*****	0.0143	0.0001
JUL 17,84	JUN 19,84	0.015	0.0001	0.0778	0.0490
AUG 14,84	JUL 17,84	0.008	0.0001	0.1080	0.0912
SEP,11,84	AUG 14,84	0.010	0.0001	0.1030	0.0646
OCT 9,84	SEP 11,84	0.008	0.0002	0.0278	0.0030
NOV 6,84	OCT 9,84	G 0.052	0.0002	0.0272	0.0001
DEC 4,84	NOV 6,84	0.004	0.0001	0.0191	0.0005
JAN 2,85	DEC 4,84	0.010	0.0002	0.0241	0.0023

PART X

1984 TORONTO

CUMULATIVE PRECIPITATION CHEMISTRY LISTINGS

ONTARIO MINISTRY OF THE ENVIRONMENT
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APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : TORONTO/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	SAMPLING START HR.	END HR.	SAMPLE TYPE 01-RAIN 02-SNOW 03-COMP/04-OTHER	GAUGE DEPTH(MM)	GAUGE TYPE 00-APIOS 09-AES	SAMPLE NUMBER	PROJECT CODE 02-APIOS 03-SPECIAL	SUBPROJECT CODE 01-MOE 03-AES	SAMPLER EFFICI- ENCY (%)	COMMENTS FIELD OFFICE
JAN 31,84	JAN 3,84	900	900	2	36.0	0	40128	2	1	86	
FEB 28,84	JAN 31,84	900	900	2	94.6	9	40132	2	1	39	
MAR 27,84	FEB 28,84	900	830	3	58.0	0	40151	2	1	73	C H
APR 24,84	MAR 27,84	830	810	1	48.0	0	40157	2	1	53	C HM
MAY 22,84	APR 24,84	810	1330	1	31.0	0	40160	2	1	129	C NHM
JUN 19,84	MAY 22,84	1330	900	1	80.0	0	40192	2	1	73	C H
JUL 16,84	JUN 19,84	900	1530	1	42.0	0	40219	2	1	90	
AUG 14,84	JUL 16,84	1530	930	1	*****	*	40220	2	1	***	C
SEP 11,84	AUG 14,84	930	1530	1	80.0	0	40221	2	1	103	
OCT 9,84	SEP 11,84	1530	1500	1	36.0	0	40226	2	1	64	AC
DEC 4,84	NOV 6,84	1500	930	3	21.0	0	40231	2	1	186	CD NH
JAN 2,85	DEC 4,84	930	1000	3	68.0	0	40239	2	1	80	C C

REMOVAL DATE	EXPOSURE DATE	VOLUME ML	CONDUCT. UMHO/CM	PH LAB	TOTAL H+ TO PH8.3 MG/L	SULPHATE MG/L	NITRATE AS N MG/L	CALCIUM MG/L
JAN 31,84	JAN 3,84	1012.0	58.2	4.34	0.0924	4.50	1.25	1.62
FEB 28,84	JAN 31,84	1203.0	44.5	7.19	0.0204	5.60	1.02	4.00
MAR 27,84	FEB 28,84	1376.0	36.0	6.98	0.0264	4.85	0.81	2.55
APR 24,84	MAR 27,84	826.0	23.2	7.61	0.0160	4.40	0.67	2.61
MAY 22,84	APR 24,84	1302.0	23.8	U 6.90	0.0216	5.05	0.65	1.85
JUN 19,84	MAY 22,84	1901.0	35.0	4.26	0.0902	5.05	0.56	0.76
JUL 16,84	JUN 19,84	1238.0	48.4	4.06	0.0962	6.20	0.64	0.68
AUG 14,84	JUL 16,84	1052.0	26.9	4.49	0.0600	3.55	0.46	0.60
SEP 11,84	AUG 14,84	2681.0	49.8	4.13	0.1106	5.75	0.71	0.89
OCT 9,84	SEP 11,84	758.0	60.2	4.09	0.1240	8.00	0.99	1.46
DEC 4,84	NOV 6,84	1270.0	32.2	4.87	0.0450	5.15	0.88	2.00
JAN 2,85	DEC 4,84	1780.0	31.3	4.67	*****	2.85	0.53	0.86

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : TORONTO/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	CHLORIDE MG/L	KJELDAHL AS N MG/L	MAGNESIM MG/L	POTASSIM MG/L	SODIUM MG/L	AMMONIUM AS N MG/L	PHOSPHOR MG/L
JAN 31,84	JAN 3,84	5.45	0.66	0.280	0.045	3.480	0.580	0.021
FEB 28,84	JAN 31,84	5.00	0.53	0.480	0.065	3.000	0.410	0.015
MAR 27,84	FEB 28,84	4.10	0.25	0.460	0.035	2.480	0.188	0.005
APR 24,84	MAR 27,84	0.68	0.42	0.405	0.060	0.360	0.340	0.011
MAY 22,84	APR 24,84	0.46	0.72	0.335	0.065	0.095	0.650	0.006
JUN 19,84	MAY 22,84	0.25	0.72	0.150	0.040	G 0.600	0.605	0.006
JUL 16,84	JUN 19,84	0.44	0.81	0.155	0.105	0.170	0.710	<T 0.002
AUG 14,84	JUL 16,84	0.10	0.56	0.080	<T 0.010	0.020	0.480	<T 0.003
SEP 11,84	AUG 14,84	0.29	0.64	0.185	0.035	0.080	0.520	0.015
OCT 9,84	SEP 11,84	0.46	1.18	0.235	0.105	0.115	1.050	0.029
DEC 4,84	NOV 6,84	0.78	0.68	0.445	0.030	0.200	0.545	0.021
JAN 2,85	DEC 4,84	1.28	0.43	0.165	0.050	0.690	0.385	<T 0.003

REMOVAL DATE	EXPOSURE DATE	MANGANSE MG/L	NICKEL MG/L	ZINC MG/L	IRON MG/L	LEAD MG/L	VANADIUM MG/L	ALUMINUM MG/L
JAN 31,84	JAN 3,84	0.010	0.001	0.054	0.183	0.059	< 0.002	0.153
FEB 28,84	JAN 31,84	0.016	< 0.001	0.049	0.257	0.058	< 0.002	0.166
MAR 27,84	FEB 28,84	0.014	< 0.001	0.052	0.201	0.073	< 0.002	0.155
APR 24,84	MAR 27,84	0.009	< 0.001	0.032	0.245	0.053	< 0.002	0.183
MAY 22,84	APR 24,84	0.012	< 0.001	0.025	0.197	0.037	< 0.002	0.255
JUN 19,84	MAY 22,84	0.006	< 0.001	0.013	0.062	0.019	< 0.002	0.064
JUL 16,84	JUN 19,84	0.006	< 0.001	0.015	0.059	0.017	< 0.002	0.051
AUG 14,84	JUL 16,84	0.003	< 0.001	0.007	0.030	0.011	< 0.002	0.043
SEP 11,84	AUG 14,84	0.005	< 0.001	0.016	0.060	0.019	< 0.002	0.063
OCT 9,84	SEP 11,84	0.009	< 0.001	0.015	0.097	0.019	< 0.002	0.086
DEC 4,84	NOV 6,84	0.013	0.001	0.033	0.150	0.038	0.001	0.107
JAN 2,85	DEC 4,84	0.005	0.001	0.021	0.081	0.030	0.000	0.068

ONTARIO MINISTRY OF THE ENVIRONMENT
CUMULATIVE SAMPLING ANALYSIS RESULTS
APIOS - ACIDIC PRECIPITATION IN ONTARIO STUDY

STATION NAME : TORONTO/CUMULATIVE PRECIP.

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REMOVAL DATE	EXPOSURE DATE	COPPER MG/L	CADMIUM MG/L	TOTAL H+ GRAN MG/L	FREE H+ MG/L
JAN 31,84	JAN 3,84	0.008	0.0004	0.0924	0.0457
FEB 28,84	JAN 31,84	0.008	0.0004	0.0200	0.0001
MAR 27,84	FEB 28,84	0.011	0.0003	0.0275	0.0001
APR 24,84	MAR 27,84	0.005	0.0001	0.0170	0.0000
MAY 22,84	APR 24,84	0.005	0.0002	0.0229	U 0.0001
JUN 19,84	MAY 22,84	0.003	0.0001	0.0876	0.0550
JUL 16,84	JUN 19,84	0.003	G 0.0190	0.1100	0.0871
AUG 14,84	JUL 16,84	< 0.002	0.0001	0.0610	0.0324
SEP 11,84	AUG 14,84	0.003	0.0001	0.1090	0.0741
OCT 9,84	SEP 11,84	0.003	0.0003	0.1230	0.0813
DEC 4,84	NOV 6,84	0.014	0.0004	0.0449	0.0135
JAN 2,85	DEC 4,84	0.005	0.0002	0.0532	0.0214

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Cumulative (28 day)
precipitation chemistry listings
of sites in industrial/urban areas
in Ontario : January 4, 1983 -
78096